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Reclaimed Rubber

No Longer a Substitute

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ONE of the most important factors in the rubber situation since 1924 has been reclaimed rubber, and it remains today one of the uncertainties of the trade with which not only chemists and technical men are concerned, but also the crude rubber trader and purchasing agent, because of its effect in the consumption of crude rubber. Even exporters of rubber products are interested from a competitive viewpoint.

Reclaimed rubber has in the past been an important factor in the trade chiefly in the U. S. A. and Canada, the latter because practices in United States factories are promptly adopted in American subsidiary plants across the border. It is only for these two countries that any record of the annual consumption of reclaimed rubber is available. There is, however, plenty of evidence that reclaim has already come into considerable favor in Europe, and in Australia and Japan, also, considerable quantities are used. The lack of anything except hazy estimates regarding the extent of its use abroad makes it impossible to describe the foreign situation at great length or with much definiteness.

While it would be outside the scope of such an article as this to describe what reclaimed rubber is, it is certainly apropos to relate briefly the foreign attitude regarding it, and particularly the attitude of rubber producers. Although reclaims have been in use for many years, they fell into disfavor in America in 1920-22 partly because of the extremely low price of crude rubber and partly because the chemists did not know then how to make use of reclaims so as to get the best results. Fortunately or unfortunately, restriction quickly remedied the rubber-price situation, and supplied the incentive for technical men to give more attention to the stable-priced "substitute." The word substitute is used because it quite accurately describes the opinion then held generally by rubber producers with regard to reclaimed rubber. They believed it was an inferior substance used to replace and to reduce the demand for crude rubber. They believed products made partly of reclaimed rubber were bound to be of poor quality, and would wear out so quickly that more frequent replacement would be necessary; so that no ultimate saving of crude rubber would result. Rubber trade journals in British Malaya and even in England not so long ago advised readers not to use American tires because they contained reclaim and were perforce unreliable. Reclaimed rubber publicity in America, even as late as 1927, was quite generally regarded in England as a part of the American propaganda against restriction, and was thought of by many rubber growers as American "bluff." Credence was only gradually given to the statistics regarding use of reclaim.

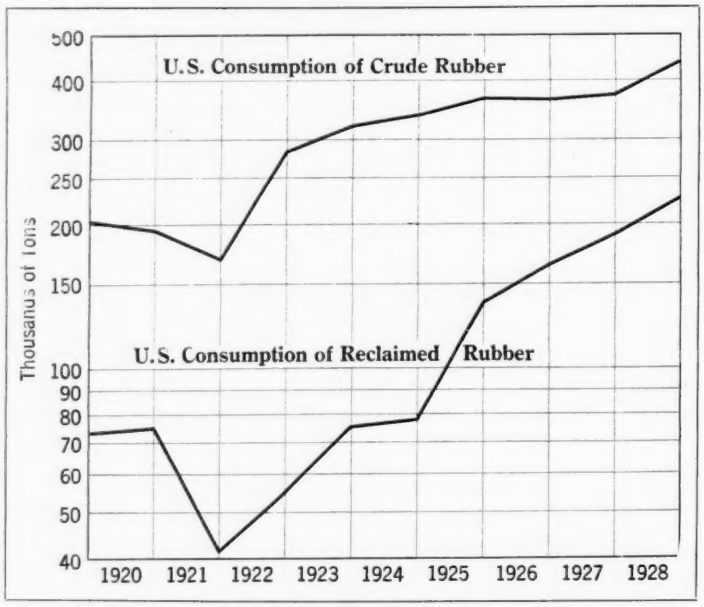
Let us for a moment examine the statistics of American consumption of crude and reclaimed rubber. The importance of reclaim led to federal-government surveys of its production and consumption by the Rubber Division in 1925 and 1926; in 1927 the consumption statistics gathered by the Census Bureau were supplemented by another Rubber Division survey; and the latest such statistics covering 1928 consumption of crude and reclaimed rubber have just been released. Statistics for years prior to 1925 are based on reports of the Rubber Association of America. A ten-year consumption record is now available for the United States, and the official figures may be seen in the following tabulation.

UNITED STATES CONSUMPTION OF CRUDE AND RECLAIMED RUBBER

	Crude Rubber, Long Tons	Reclaimed Rubber, Long Tons	*Reclaim Crude, Per Cent
1919	202,303	73,535	36.3
1920	196,270	75,297	38.4
1921	169,308	41,351	24.4
1922	283,271	54,458	19.2
1923	319,700	75,200	23.5
1924	336,600	78,500	23.3
1925	387,629	137,000	35.3
1926	366,000	164,500	45.0
1927	373,000	189,500	50.8
1928	437,000	223,000	51.0

*In European practice, the "per cent" is frequently calculated by dividing reclaimed rubber tonnage by total tonnage of crude and reclaim.

Since there is still some scepticism in foreign countries regarding the use of reclaimed rubber in America to the extent indicated above, a few additional facts may be excused. Statistics were gathered by the War Industries Board in 1918, covering use of reclaimed and crude rubber by products for 1917. The figures showed that in rubber tires and inner tubes of all kinds only 19.0 per cent as much reclaim as crude was employed; in all other products taken as a group, the percentage $\frac{\text{Reclaim}}{\text{Crude}}$ was 144.7. The survey showed that mechanical rubber goods, rubber insulated wires, waterproof cloth, rubber footwear, hard rubber products, and similar articles contained a large percentage of reclaimed rubber.



Consumption of Crude and Reclaimed Rubber Compared

The Rubber Division survey for 1926 called for separate statistics on consumption of (a) crude rubber and (b) reclaimed rubber in (1) tires and inner tubes of all kinds, and (2) all other products. The results of that survey showed that $\frac{\text{Reclaim}}{\text{Crude}}$ in tires was 19.8 per cent, in all other rubber products 176.9 per cent. But 1926 was only the beginning of the new popularity of the product. Greater compounding knowledge and skill showed that it could be successfully employed to an extent previously considered harmful with the result of actually improving the quality of many products; that its plasticity reduced milling expenses, that its content of many compounding ingredients required in the finished product reduced the purchases of various chemicals. In short, instead of a substitute, reclaimed rubber is now a compounding ingredient and as such it has most surely come to stay.

If proof of the last statement were needed, one need only study the statistics of 1928 consumption in the United States. For the last eight months of 1928 the price of crude rubber was steady between 18 and 19 cents per pound as compared with a range of 33 to 42 cents in the preceding year, and yet the ratio $\frac{\text{Reclaim}}{\text{Crude}}$ remained stable for the two years. This result is a matter of general surprise, because unofficial statistics of the Rubber Association indicate a decreased ratio of reclaim in the closing months of the year; for the first half of 1928 the percentage was about 55 per cent against 47 per cent for the last half. It is natural that low prices for crude rubber should affect the use of reclaim to some extent, but the likelihood of the ratio falling as low as 40 per cent in the next year or two seems remote.

It remains to explain why reclaim continues to be used so generally. Its inherent good qualities as a rubber compounding ingredient furnish the strongest reason. Manufacturers' reluctance to change compounds which are proving satisfactory will prevent rapid replacement of reclaim by crude rubber. Manufacturers have learned to rely upon the stability of quality and price for standard grades of reclaimed rubber. Many of the largest rubber manufacturing companies operate reclaiming plants to supply their own needs, and it is difficult to say how low the price of crude rubber would have to go to make them forego use of reclaim. Finally, the rubber manufacturing business is still so highly competitive that no opportunity to save in production costs can be neglected, and reclaimed rubber seems to be a penny saver of importance even with crude rubber around 20 cents per pound.

All the above facts augur well for the comparative soundness of the reclaiming industry in the United States. It is certain that the use of reclaimed rubber abroad has increased similarly, even if complete statistics are not available. Something of the trend is shown by the following table covering exports of reclaimed rubber from countries which report this trade separately in their official reports of trade. Only small amounts of reclaim are imported into the United States; hence these exports indicate the trend of foreign consumption of reclaimed rubber.

ANNUAL EXPORTS OF RECLAIMED RUBBER

Long Tons

	United States	United Kingdom	Germany	Italy	Total
1923	2,013	237	110	197	2,557
1924	2,437	364	117	81	2,999
1925	4,571	1,596	386	145	6,698
1926	5,391	2,046	1,733	106	9,276
1927	8,540	2,536	874	491	12,441
1928	9,577	*3,017	1,372	*130	14,096

*Estimated.

The following statistics cover consumption of crude rubber and reclaimed rubber in Canada and Netherlands, the only two foreign countries for which such statistics are available:

CONSUMPTION OF CRUDE AND RECLAIMED RUBBER IN CANADA AND NETHERLANDS

Long Tons

	Canada		Netherlands	
	Crude	Reclaim	Crude	Reclaim and Scrap
1922	10,168	2,277	761	220
1923	13,927	3,065	819	205
1924	13,783	3,625	880	374
1925	19,030	5,415	815	867
1926	19,209	7,308	583	1,180
1927	25,700	9,217	Not available	

Estimates of European consumption of reclaimed rubber are of the haziest description. One French authority places

the quantity in England, France, and Germany during the past year at 42,000 tons, dividing it equally between the three countries. My personal guess is that French manufacturers have been using relatively more reclaimed rubber than the others, with the German industry a close second, and England third by some margin. The continuance of this situation is not very likely. Competition in rubber manufacturing is international as well as local. American manufacturers are showing by the excellent quality of their exported products that correct use of reclaim does not result in poor quality, and to meet their competition, their competitors have had to use reclaim.

The British Dunlop Co. for years advertised that its tires contained no reclaimed rubber, but such advertising was stopped about two years ago. Several American manufacturers have within the past two years established subsidiary factories in England and Australia, and it is certain that compounds proven successful in the United States will be used in these factories, making the likelihood for increased use of reclaim abroad even more apparent. Excellent-appearing samples of French reclaimed rubber were exhibited at the Paris Rubber Exposition in January, 1927. An American firm recently attempting to secure orders for reclaim from Belgium manufacturers is informed that French reclaim is satisfactory and cheaper in price than American grades. The evidence, such as it is, goes to show that France copied a leaf from the American book of resources adopted under pressure of restriction, and did it quite successfully, in utilizing scrap tires for reclaimed rubber.

Just a word about the supply of raw material for reclaimed rubber. It has already been stated that the percentage of reclaimed rubber used in the manufacture of tires is low as compared with the percentage used for such products as rubber hose and packing, rubber flooring, paving, mats and matting, heels, hard rubber goods, rubber-covered wires, water bottles, and even rubber boots and shoes. In inner tubes very little reclaim is used. For reclaiming purposes, casings and inner tubes and certain types of rubber footwear are the basic raw materials. Hence it follows that reclaimed rubber that is used in other products has been consumed for the last time; these products are not used in production of reclaim. Practically all discarded inner tubes and most worn-out casings, within the limits of economical freight transportation, find their way to the reclaiming factories. The tire beads are cut off and not used in reclaiming; this is one part of the tire which generally contains much reclaimed rubber.

Enough experience has accumulated during the past four years to indicate that the introduction of reclaimed rubber into tire compounds has not ruined the quality of the reclaimed rubber prepared from these tires; this is probably due to refinements in reclaiming and constant watchfulness by reclaimers to insure reliability of their product. As new tires are being manufactured and old tires discarded, in increasing numbers each year, it follows that there is a continuing supply of raw material suitable for use by reclaimers. Some of this raw material has been too far distant from reclaiming plants to be economically transported as scrap rubber, and this situation is already in process of being remedied through establishment of reclaiming factories at points near such centers of supply for scrap.

In the past there has been a tendency to believe that the use of reclaimed rubber depended largely on the price at which crude rubber was selling. This is no longer a true statement of the case; it might even be said that the use of reclaimed rubber is now one of the principal factors affecting the price of crude rubber. In other words, it is possible that crude rubber prices low enough to make the use of reclaim uneconomical may now be below the average cost of production of crude rubber.

To the crude rubber trader or purchasing agent, reclaimed rubber is a distinct factor for consideration in making estimates as to future rubber consumption. Suppose his normal estimate of 1929 United States rubber consumption is the same as the final official statistics for 1928, 437,000 tons of crude rubber, if the use of reclaim continues unabated. Suppose he believes that for 1929 the percentage use of reclaim is going to be 45 per cent instead of the 51 per cent obtaining for 1928, how much added tonnage of crude rubber should he allow for in view of this lower percentage of reclaim? The percentage of reclaim used in any foreign country is believed to be lower than in the United States at present, leaving room for further development abroad. If foreign manufacturers should use as high a ratio of reclaim as in America, what effect would it have on their crude rubber requirements? Reclaim is another factor complicating the always hazardous task of trying to tell in advance the relation between the demand for and the supply of crude rubber.

Rubber manufacturing outside the United States is increasing more rapidly than it is in this country; five years ago we used 70 per cent of the rubber consumed annually, now we use about 65 per cent. This is the natural result of our having adopted motor transportation so much more rapidly than any other country. It is certain that the next ten years will show tremendous growth of automobile transportation abroad, and that rubber consumption over the period will likewise steadily increase. Reclaimed rubber has proven its intrinsic merit, and it will certainly continue one of the important factors in the situation. The provision of reliable statistics of reclaimed rubber consumption in France, Germany, England, and Italy would be a worth while undertaking for manufacturers in those countries, and would be of general interest and value, and separate classification of the product in French and British official monthly reports of imports and exports would also be helpful.

Tire Manufacturers Against Cotton Duty

Speaking for the Tire Division of the Rubber Association of America, Inc., M. E. Clark, at a recent hearing given by the House Ways and Means Committee at Washington, advised against the taxing of Egyptian long staple cotton as urged by Southwestern Pima cotton growers. He held that such a duty could not appreciably benefit American growers of either long or short staple cotton but would be a burden on tire manufacturers who could not dispense with imported long staple of Egyptian quality for many of their cord fabrics. Replying to a question, Mr. Clark said that the rubber industry was not averse to having the 10 per cent duty on tires removed, as imports are negligible.

Proposed Revision of Specifications for Rubber Goods

The Federal Specifications Board, Washington, D. C., is adopting and promulgating purchase specifications for commercial commodities purchased by the various departments and establishments of the United States Government. The details are listed in the bulletin entitled "Proposed Revision of U. S. G. M. S. 59a, United States Government, General Specifications for Rubber Goods, Packing Materials and Caskets (Methods of Physical Tests and Chemical Analyses)."

These specifications, in the formative stage, are submitted to representative manufacturers for their comment and criticism. The Federal Specification Board will be glad to receive any comments or suggestions as to changes which may be thought to be desirable in the specification. To receive the attention of the technical committee, comments must be received by the Board not later than May 27.

Temperature Coefficient of Vulcanization on a Litharge Compound

J. R. SHEPPARD

THE influence of temperature on vulcanization is too well known to require emphasis—it has been generally recognized for quite a number of years that the relation between temperature and time for ordinary curing ranges was logarithmic although there has been no unanimity as to the exact relationship. This doubtless is in part due to the varying experimental conditions employed by the investigators and possibly in some cases to less precise measurements. Table I, a partial bibliography, shows some values for the temperature coefficient which have been obtained and the conditions used. It will be seen that values ranging from 8 to 25 have been reported for the coefficient (in terms of degrees Fahrenheit required to double the rate of cure).

It is the purpose of this paper to recount the writer's determination of the temperature coefficient for a given litharge stock in press cures—it is not safe perhaps to infer from the present results what might hold under certain other conditions.

General

Rate of, degree of, and the temperature coefficient of vulcanization can be expressed only in terms of some property or properties of the stock assumed to be proportional to vulcanization; and indeed the term vulcanization in a given case takes its exact significance from the property assumed as its criterion. In the present instance the criteria are the several properties pertaining to the stress-strain curve, and free sulphur. While the final results showed no significant difference in the temperature coefficients for the several criteria, the latter, nevertheless, have been treated as separate functions so as to bring out any difference in their coefficients.

Figure 1A illustrates the kind of data sought and the treatment. In terms of the quantities actually measured, the temperature coefficient of vulcanization may be described as the relation between time (t) and temperature (T) which holds for all cures on a given stock resulting in a constant value of that property (P) taken as the criterion of vulcanization.

This relation is a case of the three-dimensional relation between the variables t, T, and P which shows the values of the property obtained at *all* times of cure and temperatures.

In outline, therefore, the procedure for determining the time-temperature relation characteristic of the temperature coefficient is (a) to carry out such variations of time and temperature, with observations on the corresponding values of the property, as are necessary to delineate the *general* time-temperature-property relation; (b) plot the general relation as a spacial locus; and (c) intersect the locus of the general relation with a constant property plane, the intersection being the locus of the temperature coefficient equation desired. In practice, in place of constructing a spacial graph, it is more convenient to employ the equivalent, namely a family of curves, as illustrated farther on.

In Figure 1A the curved surface $A_1B_1B_4A_4$ is the locus of the property (P) as time (t) and temperature (T) are varied, (the general relation). We may presume this surface to have been determined by drawing it through the individual plane curves A_1B_1 . . . . A_4B_4 which are all in planes parallel to the POt coordinate plane, and we may presume that each of the latter curves has been determined through measurements of the property on a series of vulcanizates cured at constant temperature but for varying times. The curves A_1B_1, and so forth, are of course the

TABLE I

Author and Conditions of Determination	Temperature Coefficient[1] I	II
A. O. Bourn[2] in 1905 on the formula P. Para 100, Sulphur 3, litharge 50, whiting 50, claims, in a short note lacking details, to have obtained "perfect" vulcanizations in 211 days at 105°F and in 1 second at 600°F. The method whereby the short cure was controlled is not indicated. He did not publish a temperature coefficient, but when such is calculated as a mean value for the above extremely wide temperature range we have ...	20–21	1.8
Spence & Young[3] in 1912 on rubber with 10% sulphur for the interval 135°C (275°F) to 155°C (311°F), using combined sulphur as criterion give	12.8	2.65
A. O. Bourn[4] in 1913 on the same formula as above subjected to dry heat cures found, for the interval 194°F to 262°F, on the basis of (unspecified) physical properties	11	3.1
The cures were continued up to 400°F, but at about 262°F the data indicate the commencement of a change in the coefficient such that a given temperature increment effects decreasing acceleration of the cure as the temperature rises. The extent of this lessening influence of temperature increase may be judged by citing the last interval viz. from 375°F to 400°F which shows	2½	1.6
The 400°F cure is recorded as of 3 seconds duration.		
A. van Rossem[5] in 1918, using combined sulphur as criterion, found for the rather restricted interval 145°C (294°F) to 155°C (311°F)	18	8
Twiss & Brazier[6] in 1920 on the compound P. Crepe 90, Sulphur 10, for the interval 128°C (262°F) to 168°C (334°F) found using combined sulphur as criterion;	15.0	2.7
using extensibility at given elongation as criterion;	15.0	2.7
using time to reach maximum tensile as criterion.....	14.2	2.6
Although they state that the coefficient "manifests no tendency to any regular increase or decrease with rise of temperature", a footnote indicates that "on account of the inconveniently rapid progress of vulcanization at 168°C and its slowness at 128°C, the measurements at 138°C to 158°C are possibly to be preferred". The mean value obtained for this more limited interval on the basis of all three criteria was..	13.0	2.6
On the same formula as above with the addition of varying amounts of aldehyde ammonia ranging up to 1%, for the interval 108°C (226°F) to 148°C (298°F), on the basis of all three criteria the coefficient obtained was substantially as for the rubber-sulphur mix, namely	14.2	2.4
However, for the interval 98°C (208°F) to 108°C (226°F) a given temperature increment had markedly more effect namely	8	4
J. R. Sheppard in this paper, on the litharge stock detailed within, for the interval 242°F to 338°F, in press cure, and using as criteria various physical properties depending on the stress-strain and also free sulphure finds as mean values	13.1	2.59
It is considered that no significant variation of coefficient is shown within this temperature range, and that no significant difference as between the individual criteria exists.		

Footnotes to Preceding Table

1. Column headed I gives number of degrees Fahrenheit required to double the rate of cure; column headed II gives the factor by which the rate is multiplied when the temperature is raised 10° Centigrade. The figure underlined was calculated by original author.
2. I. R. W., 33, 93 (1905)
3. J. Chem. Ind. Kolloids, 11, 28 (1912)
4. I. R. J., 45, 120 (1913)
5. Comm. of Neth. Govt. Inst. for Adv. Rubber Ind. Part VI, 179-222.
6. J. S. C. I., 39, 125T (1920).

Table 1. Partial Bibliography Showing Values for Some Temperature Coefficients Obtained and Conditions of Determination.

NOTE—Publication permitted by *Ind. & Eng. Chem.* Paper read under the title, "An Experimental Determination of the Temperature Coefficient of Vulcanization with Litharge," before the Division of Rubber Chemistry of the American Chemical Society, St. Louis, Mo., April 18, 1928.

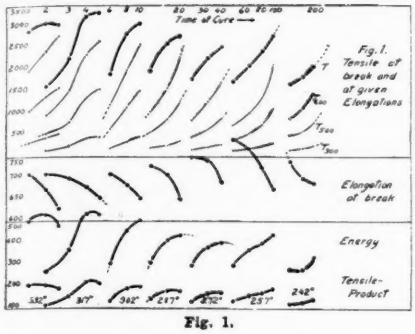


Fig. 1.

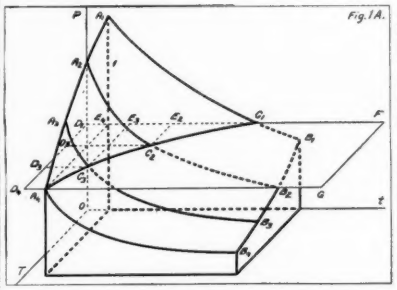


Fig. 1A.

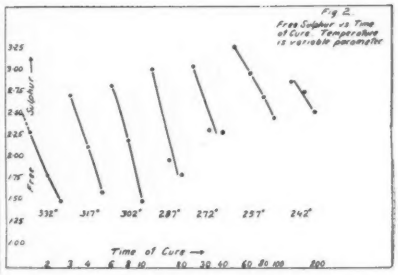


Fig. 2.

"curing curves" of common practice, frequently involving tensile versus time. In the figure, the planes of the curves A_1B_1, A_2B_2 are spaced along the temperature axis OT so as to correspond with their respective temperatures. The plane D_1FGD_4' is parallel to the TOt coordinate plane and removed from it a distance OD_1, corresponding to the constant value of the property which it is desired to use as a criterion. The intersection of this plane with the general surface is in the line $C_1C_2C_3A_4$ and *this line is, with respect to the axes D_1D_4 and D_1F, the time-temperature locus for a fixed value of the property which is sought as an expression of the temperature coefficient of vulcanization.*

It is desirable, to increase the reliability of the result, to employ several planes parallel to D_1FGD_4 representing different constant values of the property, and, of course, in the case of a subject like rubber, where so many criteria of cure *can* be used, it is desirable to employ at least several criteria, if for no other reason, in order to establish whether or not the temperature coefficient is the same for all of them. There is no theoretical or *a priori* reason for presuming it is.

Experimental

It has not been attempted in the present study to cover a variety of compounds or types of vulcanization. On the contrary the work has been confined to press cures on a single litharge stock. A quantity of stock of the composition

Smoke sheet	100
Sulphur	8
Litharge	15
Zinc oxide	44
Stearic acid	1

was master-batched and press cures were commenced the next day, being continued over a period of 4 days. The temperatures of vulcanization ranged from 242°F to 332°F at 15-degree intervals and the times from 1½ minutes to 192 minutes, 3 or 4 different times being employed with each temperature. As in general the properties of a stock alter more rapidly in the early (undercure) part of a cure than in the later part, in the neighborhood of the optimum and in the overcure region, the properties during the early stages form a more sensitive criterion of state of cure than those in the more advanced stages. Consequently the times of cure for each temperature were chosen to yield in the main undercures, although as the data show the optimum was reached and passed in several cases.

In view of the short times involved at the higher temperatures it was necessary to minimize errors by due precautions. A mold maintained at the curing temperature between the platens for at least half an hour was withdrawn as quickly as possible, the single sheet of rubber which was to be cured was inserted, the mold returned and the platens closed on it. The time of cure was counted in all cases as commencing with the instant both platens formed contact with the mold and terminating with the instant that contact of the top platen with the mold was broken on release of the hydraulic pressure. The period between the termination of one cure and the commencement of the next at the same temperature, as defined above, was 1 minute or less. The mold had little opportunity to cool as during only a fraction of this period was it entirely out of the press.

The average gage of the cured sheets was .083". The day following its cure, stress-strains were determined on each vulcanizate with the Scott machine by the two-observer method. Free sulphurs were also determined by the bromine method[1]. These were done at somewhat irregular time intervals after vulcanization, within a period of about two months.

When planning the cures, it was assumed, in accordance with a quite generally accepted rule, that a rise of 15°F would entail a doubling of the rate of cure and this was the reason for making 15° the interval between consecutive temperatures. The choice of temperature and of time intervals in no way influences the relationship ultimately found, but is solely a matter of experimental convenience and more particularly of insuring that the zone of the time-temperature-property surface which will be delineated will be broad enough to include all or a goodly part of the intersection with the constant property plane.

Table 2. Physical Properties and Free Sulphurs After Vulcanization for Various Times and at Various Temperatures.

Temp.	Time	Tensile at Elongation of 100	200	300	400	500	600	700	T	E	T.P.	Ey	% Free Sulphur
242	128	70	108	165	278	500	886	1455	1690	740	125	280	2.68
	160	77	128	198	331	591	1125	1845	1845	700	129	281	2.77
	192	87	150	262	431	805	1492		2092	630	144	341	2.53
257	48	62	89	152	215	418	734	1215	1735	790	137	300	3.28
	64	74	111	191	309	555	1015	1765	2110	770	162	374	2.98
	80	88	151	251	416	753	1387	2275	2437	725	173	398	2.71
	96	87	193	335	596	1130	2125		2812	677	190	342	2.47
272	24	74	98	159	282	479	864	1587	1797	750	134	300	3.07
	32	72	138	216	323	628	1287	2067	2285	743	169	386	2.33
	40	99	185	296	512	894	1715		2542	692	175	400	2.31
287	12	74	117	209	315	574	1040	1735	1992	730	145	313	3.03
	16	88	168	275	481	874	1590	2550	2625	708	185	413	1.99
	20	119	249	380	720	1302	2305		2797	652	183	437	1.82
302	6	84	121	206	352	642	1205	1900	1921	710	136	312	2.85
	8	102	179	357	635	1137	2006		2865	685	196	457	2.22
	10	138	287	470	827	1530	2605		3094	653	202	505	1.51
317	2	74	99	160	292	543	982	1600	1650	710	117	276	—
	3	81	157	254	447	803	1545	2275	2275	700	159	369	2.74
	4	106	260	449	780	1375	2375		3255	680	221	534	2.14
	5	151	293	476	837	1575	2690		3330	655	218	528	1.61
332	1.5	103	202	333	562	1070	1978	2845	2907	710	206	496	2.31
	2	127	275	439	792	1407	2442		3086	675	208	528	1.80
	2.5	144	318	520	872	1605	2800		3060	630	193	478	1.51

Results

All results, namely stress-strain data and free sulphurs, are found in Table 2, which we need not comment on otherwise than to remark that it exhibits the well-known variations of properties with time of cure.

In Figure 1 all the physical data of Table 2 are graphed. Properties are plotted vertically and time horizontally, the latter to a logarithmic scale, well adapted to the purpose, as it enables both long and short cures to appear in the one graph, without crowding of the latter or undue spreading of the former. The data for a given property are plotted as a family of property-time curves

[1] "Standard Methods for the Analysis of Rubber Goods—Recommended by the Committee on Methods of Analysis of the Division of Rubber Chemistry of the A. C. S." *Ind. Eng. Chem.*, 16, 397 (1924).

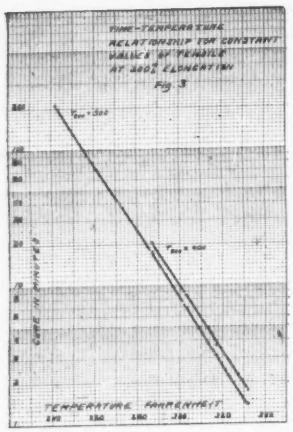


Fig. 3.

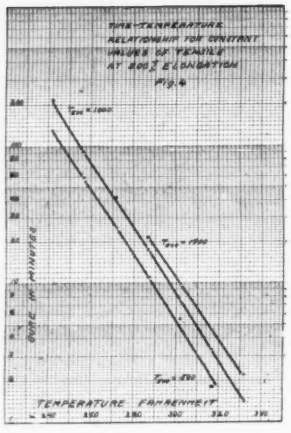


Fig. 4.

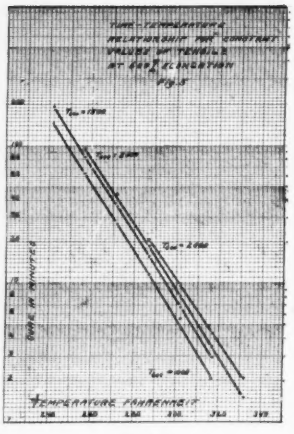


Fig. 5.

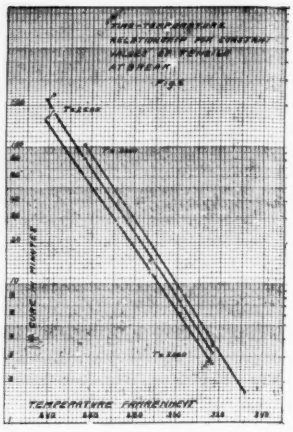


Fig. 6.

with temperature as variable parameter, and as such can be made to function in the same way as the spacial locus of Figure 1A. The temperatures are noted near the bottom of the graph, associated with their respective groups of curves. In a number of cases extrapolations have been made, these being distinguished by broken lines.

The properties shown in Figure 1 as criteria of state of cure are: Breaking tensile (Marked "T"); Tensile at 600% elongation ("T_{600}"); Tensile at 500% elongation ("T_{500}"); Tensile at 300% elongation ("T_{300}"); Elongation at break; Energy; Tensile Product. Of these properties the greatest reliance is placed on the tensiles at given elongations because of (a) their sensitiveness to cure, and (b) the relatively high accuracy with which they can be determined.

Although Figure 1 is intended to serve only as the basis for building up Table 3, several characteristics are observable even on cursory examination and these may be noted. (a) Any two adjacent curves for a given property have about the same distance between them, measured along a given horizontal line (provided that, in the case of properties which reach a maximum, the measurement is not made too near the latter). (b) The several curves of a family are roughly of the same shape and orientation, so that the horizontal interval between adjacent curves is roughly the same irrespective of the level at which it is measured [with the same proviso as in (a)]. (c) The horizontal intervals between curves in one family and those in another are about equal. We need not comment here on the significance of these observations as this will be brought out in the more exact treatment of the data in the sequel.

In Figure 2 the free sulphurs are plotted similarly. Each line represents the free sulphur as the time of cure is varied; the temperature varies from line to line. The same characteristics regarding the spacing, shape and orientation of the sulphur curves as noted above for the physical data are observable, although there is somewhat more experimental irregularity. For this reason, and because free rather than combined sulphurs are involved, less weight is, perhaps, to be attached in the present work to the chemical than to the physical results; notwithstanding which the former have yielded practically the same coefficient as the latter.

Figures 1 and 2 facilitate the derivation of the corresponding time-temperature values for constant properties. Table 3 shows the times and temperatures corresponding to from 2 to 4 fixed values of each property as read from Figures 1 and 2. Times derived from extrapolated parts of curves are shown in parenthesis in Table 3. Also in the case of tensile product and of energy the times for the various temperatures when the property reaches a maximum are shown.

TEMPERATURE °F		332	317	302	287	272	257	242
Time of Cure When Tensile at 300% Elongation Equals	300	(1.4)	3.15	7.20	17.5	40.0	90.0	(210.0)
	400	1.75	3.70	8.95	20.5	----	----	----
Time of Cure When Tensile at 500% Elongation Equals	500	--	(1.8)	(5.5)	(11.0)	25.0	59.0	130.0
	1000	1.43	3.35	7.4	17.5	(42.0)	91.0	(215.0)
	1500	2.2	4.55	9.8	(21.5)	----	----	----
Time of Cure When Tensile at 600% Elongation Equals	1000	--	2.05	(5.5)	(11.5)	26.5	63.0	146.0
	1500	--	2.95	6.7	15.5	36.3	83.0	194.0
	2000	1.52	3.5	8.0	18.6	(44.0)	95.0	----
	2500	2.08	4.30	9.5	(20.8)	----	----	----
Time of Cure When Tensile Equals	2000	--	2.65	6.1	12.0	26.7	59.5	132.0
	2500	--	3.2	6.95	14.6	38.7	82.0	(235.0)
	3000	1.65	3.6	8.8	----	----	(104.0)	----
Time of Cure When Elongation Equals	750	----	----	----	----	24.0	72.0	124.0
	700	1.65	3.00	6.9	17.0	39.0	88.0	160.0
	650	2.3	(5.1)	(10.3)	20.0	----	----	----
Time of Cure When T. P. Equals	140	----	2.65	6.1	(11.7)	25.0	50.0	185.0
	180	----	3.3	7.3	15.4	----	87.0	----
	Max.	1.75	4.4	10.0	18.0	40.0	----	----
Maximum Value of T.P.		215.0	228.0	202.0	187.0	175.0	>190.0	----
Time of Cure When Energy Equals	300	----	2.35	(5.9)	(11.7)	24.0	48.0	178.0
	400	----	3.15	6.9	14.8	40.0	80.0	----
	500	1.5	3.68	9.7	----	----	----	----
	Max.	2.0	4.5	----	(22.0)	(43.0)	----	----
Maximum Value of Ey.		528.0	540.0	----	(440.0)	(402.0)	>442.0	----
Time of Cure When Free Sulphur Equals	3.00	----	----	----	12.2	24.0	62.2	----
	2.50	(1.36)	3.30	7.2	14.5	32.4	93.5	197
	1.75	2.08	4.72	9.25	----	----	----	----

Table 3. Showing Times of Cure and Temperatures Corresponding to Fixed Values of the Several Properties. Data obtained from the intersections of horizontal (Constant Property) lines with the Property-Time Curves. Values in parentheses are from extrapolated intersections.

In Figures 3 to 10, employing logarithmic time scales, the data of Table 3 are graphed, each figure displaying the time-temperature relationships for the several constant values of a given property. Points obtained by extrapolation in Figure 1 or 2 are denoted by a hollow circle.

Figure 3 graphs the time against the temperature which results in the tensile at 300 per cent elongation assuming the values 300 and 400 respectively. Two facts concerning the lines are pronounced: first that they are straight, corresponding with a logarithmic relationship; and second that they are nearly parallel. We may note in passing that, *granting straightness*, the parallelism is a mathematical necessity, since otherwise at their intersection we should have the absurdity of the same cure in time and temperature giving rise in the one stock to two different values for a given property. It follows that any lack of absolute parallelism found between the constant property lines of any one of these graphs is due to experimental error and is of no significance.

Figure 4 shows time versus temperature for constant values of tensile at 500 per cent elongation, namely 500, 1,000, and 1,500; and Figure 5 similarly applies to tensile at 600 per cent elongation fixed at 1,000, 1,500, 2,000, and 2,500. In these 2 graphs, as in Figure 3, we find quite good conformity of the determined points to the lines drawn through them, almost the only points seriously off the lines being certain of those got by extrapolation.

Figure 6 employs tensile at break and Figure 7 elongation at

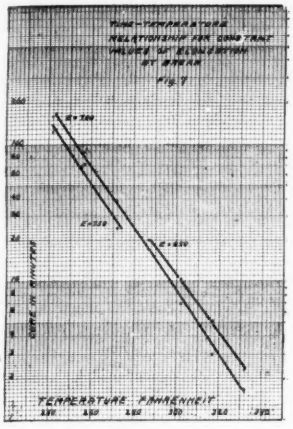


Fig. 7.

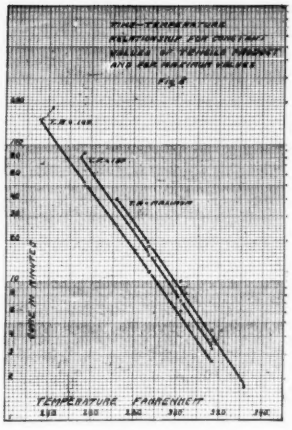


Fig. 8.

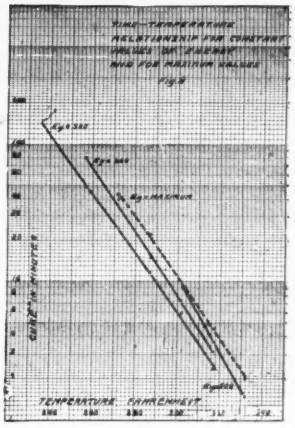


Fig. 9.

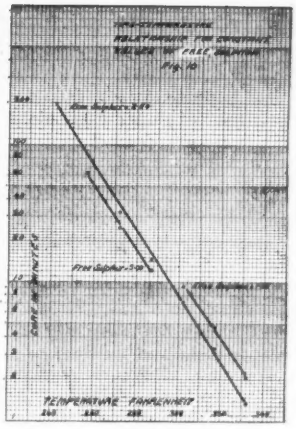


Fig. 10.

break as parameters. These, as also Figure 8 for tensile product and Figure 9 for energy, show, as might be expected due to the breaking-point error, a less perfect agreement between points and lines than the graphs for tensiles at given elongations. Nevertheless in no case is there any doubt as to the comparatively accurate placement of the line, nor is there in any case reason to believe that such deviations as occur are of significance; there is nothing to warrant deviating from the straight in drawing the lines. In Figure 8 the maximum tensile product line takes on a general alinement parallel to that of the constant value loci. The same is true of the maximum energy line in Figure 9.

In Figure 10 the time-temperature relations for constant free sulphurs are shown. The data here show more experimental divergence than in most of the physical results. Nevertheless the general trend is clear and capable of fairly exact definition.

It only remains to deduce the coefficients from the time-temperature iso-property lines of Figures 3 to 10. The coefficient following from a given line depends only on its slope. In Table 4, the coefficients are summarized, the third column giving the figure deduced from each individual line. Such lack of identity as may be found among the coefficients for the several constant values of a given property implies an equal lack of parallelism among the iso-property lines and, therefore, as explained previously, denotes experimental error. The proper treatment of these data, therefore, is to average the several coefficients for a given property. This is done in the last 3 columns of the table, the mean values themselves being found in the sixth column. The fourth column shows the number of points of determined data through which the iso-property line in question is drawn. As a 7-point line has more probability of accuracy than a 3-point line the former should have more influence in deciding the mean. The product (in column 5) of the individual coefficient and the number of points by which it was determined has been taken as the weight to grant to a given individual coefficient and the total of these weights divided by the total number of points yields the mean as found in column 6.

Property	Value of Property	Degrees F. Halving or Doubling Time of Cure	Number of Reliable points on Curve	Product of Two Preceding Figures	Average No. of degrees F. Halving or Doubling Time of Cure.
Tensile at 300 % Elongation	300	12.5	7	87.5	
	400	12.8	4	51.2	
			11	138.7	12.6
Tensile at 500% Elongation	500	12.5	6	75.0	
	1000	12.5	7	87.5	
	1500	13.4	4	53.6	
			17	216.1	12.7
Tensile at 600% Elongation	1000	12.4	6	74.4	
	1500	12.5	6	75.0	
	2000	12.6	6	75.6	
	2500	13.3	4	53.2	
			22	278.2	12.6
Tensile	2000	13.4	5	67.0	
	2500	12.8	5	64.0	
	3000	12.6	4	50.4	
			14	181.4	13.0
Elongation	750	12.7	3	38.1	
	700	13.25	7	92.8	
	650	14.5	4	58.0	
			14	188.9	13.5
Tensile Product	140	13.9	5	69.5	
	180	13.5	4	54.0	
			9	123.5	13.7
	Maximum	13.4	5		13.4
Energy	300	13.9	5	69.5	
	400	12.9	5	64.5	
	500	11.5	3	34.5	
			13	168.5	13.0
	Maximum	13.6	4		13.6
Free Sulphur %	3.00%	12.9	3	38.7	
	2.50%	12.6	7	88.2	
	1.75%	14.0	3	42.0	
			13	168.9	13.0
				Average of above	13.1

Table 4. Showing the Temperature Increment Which Halves or Doubles the Time of Cure, Corresponding to Each Constant Property Line in the Time—Temperature Graphs, with the Average Increment for Each Property.

Observing the mean coefficients for the several criteria of vulcanization we find they range from 12.6 for tensile at 300 per cent and tensile at 600 per cent to 13.7 for tensile product, with a grand average for all criteria as listed in the table of 13.1. The mean coefficients do not disagree with the grand average sufficiently to warrant a belief that the divergence has significance. The extreme deviation, holding for tensile product, is 4.6 per cent. We should conclude that, within the limits of experimental error, all properties used have yielded the same temperature coefficient of vulcanization. There is no inference that the same conclusion applies to other conditions than here investigated, such as to other compositions or types of cure, or to more extreme temperatures.

However, as a matter of fact it is highly improbable that other compositions or higher temperatures would produce the same results.

The experimental results of this paper are fully expressed by the following equation:

$$\frac{t_1}{t_2} = \frac{I_2}{I_1} = 2^{\frac{T_2 - T_1}{13.1}}$$

or $\log t_1 - \log t_2 = \log I_2 - \log I_1 = .0230\ (T_2 - T_1)$, where t_1, I_1, T_1, and t_2, I_2, T_2 are respectively a first and a second set of values of time of cure, intensity of curing action and temperature in degrees Fahrenheit.

More frequently perhaps the temperature coefficient of a reaction is expressed as the factor by which the rate is multiplied when the temperature is raised 10°C. So expressed, the temperature coefficient of vulcanization herein determined becomes 2.59, this number corresponding with the 13.1°F required to double the rate or intensity.

The original paper ended at this point, but in view of its importance the author has appended the following remarks on the extension of the method discussed.

Suggested Applications of the Method

It may not be amiss to point out how the present method can be applied to the more general study of vulcanization and of accelerators. While with litharge the temperature coefficient appears, within ordinary curing ranges, to be representable by a constant, doubtless there are cases where, on the contrary, a variable depending on temperature is involved. In any event, whether constant or variable, the coefficient, when graphed as a time-temperature locus, expresses the vulcanizing propensity of a stock under changes of temperature.

Figure 11 represents some hypothetical cases which illustrate how curing properties are reflected in the coefficient lines. A is a stock with a constant temperature coefficient, here made equal to 13°F. B is another stock which, although its temperature coefficient is identical with that for A, at all temperatures takes twice as long to cure as A. On the other hand C cures equally with A at 290° but at 240° it is seen to cure in half the time for A. Therefore, as compared with A, C is specially quick curing at low temperatures; or A is relatively fast curing at high temperatures compared with C. If A, B, and C owe their different curing characteristics to their being compounded with different accelerators, it is obvious that, relatively, accelerator A is more powerful or active than accelerator B; on the other hand C cannot be described as more active than A—it is more correct to describe C as being (compared with A) a "low temperature" accelerator. The delineation of curing properties as a function of temperature in this way distinguishes neatly, therefore, between "low temperature" accelerators and rapid or powerful ones.

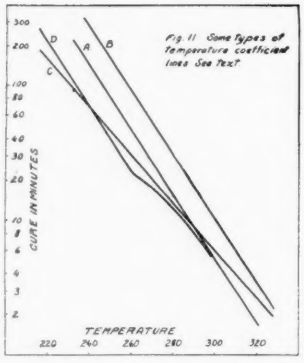


Fig. 11.

A low temperature accelerator may possess its special characteristics because of its stability below and instability above some (critical) temperature. If the loss of curing agent be abruptly dependent on temperature, rather than a gradual function thereof, then in the neighborhood of the temperature above which the loss occurs we should expect a sudden break or discontinuity in the coefficient line. This is illustrated by D where a sudden change occurs at about 260°; so that while below this temperature we have a stock curing in half the time for A, above we have an approach to the curing activity of A. A sudden change in the direction of the coefficient line is evidence of a change at the temperature in question in the character of the curing agents or in the mechanism of vulcanization.

It is suggested that a more extended study of temperature coefficients might throw light on such problems as: the more exact evaluation of the fitness of an accelerator for low or high temperature cures; the comparative effects of various types of cure such as mold, dry heat, live steam, and so forth; instability and volatility of accelerators or their products; the coupling of accelerators to avoid scorching, as in the use of litharge to prevent scorching with thiuram disulphides; comparisons of different activators with a given accelerator; adsorption of accelerators by reenforcing agents; and other of the numerous problems having to do with vulcanization as related to temperature, type of cure, and composition of stock.

Acknowledgments

The writer wishes to acknowledge his indebtedness to J. S. Blakeney and to J. F. Weiler for assistance in the accumulation of data and in the preparation of the graphs that have been used in this paper.

Belt Dressing for Eliminating Static

P. W. Edwards and J. O. Reed

Bureau of Chemistry and Soils, U. S. Dept. of Agriculture

THE danger of fires from the discharge of static electricity is well known in rubber plants where proofing is done on spreaders. The preparation of the rubber mixings for spreading requires the use of large amounts of freely volatile and flammable solvents. The same is true of rubber cement making.

It is common practice in these departments to humidify the air adjacent to the operating end of the spreading machine by permitting a small quantity of steam to escape into the air at that point and to ground the machine and belting by wire connections.

It has recently been announced by David J. Price, in charge of the Chemical Engineering Division of the Bureau of Chemistry and Soils, that relative safety from dangerous explosions and such fires as are often ignited by static electricity when it is generated by moving belts can easily be assured as the result of research work carried on in the laboratories of the United States Department of Agriculture. This research is described in detail by the authors whose summary is given in the following text.

A point of chief practical interest is the formulae for dressings which successfully eliminate static electricity from rubber and leather belting. These dressings are simple and inexpensive and should prove of great practical value in the rubber proofing plants and other industrial factories using flammable solvents.

Summary

1. Static electricity is a frequent source of ignition for gas and dust explosions.

2. Static electrical charges are generated on power transmission belts by friction of the belt on the pulley, by the separation of the belt from the pulley, and to a less extent by the friction of the atmosphere on the belt. On conveyer belts they are generated in the same way, and in addition by the friction of the conveyed material on the belt. On machinery, static charges can be accounted for by one or more of the following: (1) induction, (2) transmission from other sources, (3) by the friction of the material passing through the machine.

3. Static electricity can be removed from belts and other surfaces by grounding systems, humidifying the air sufficiently, ionizing the air in contact with the belt, or other surface by means of a gas flame[1] or by the silent discharge of high frequency and high voltage current. Static electricity can be eliminated by special belt dressings.

4. The requirements for a non-static belt dressing are as follows: (1) It must have sufficient electrical conductivity to remove or neutralize static electrical charges as rapidly as they are formed; (2) it should be of such a nature that it can be easily applied; (3)it should resist wear; (4) it should not decrease the coefficient of friction of the belt on the pulley; and (5) it should not be injurious to the belt.

5. A good rubber belt dressing can be prepared by mixing 18 parts of lamp black with 82 parts of good spar varnish. A smaller quantity of lamp black may prevent most of the cracking which develops after the above dressing is used for several months. The dressing must dry on the belt before running. A non-flammable thinner for the varnish can be prepared by mixing equal volumes of carbon tetrachloride and varnish makers' and painters' naphtha.

6. A non-static leather belt dressing which has considerable merit consists of 100 cc. liquid fish glue, 80 cc. glycerine, 100 cc. sulphonated castor oil, 170 cc. water, 82 grams lamp black, and 20 cc. of two per cent ammonium hydroxide. These proportions may not be the best for all conditions. In some cases better results will probably be obtained by increasing the quantities of fish glue and glycerine. It may be easily applied with a brush while the belt is moving. It is not necessary for the dressing to dry before running the belt. If the belt has not been properly maintained this dressing will cause the belt to stretch.

NOTE—Publication permitted by the *National Fire Protection Association Quarterly*, April 22, 1928, pp. 401-7.

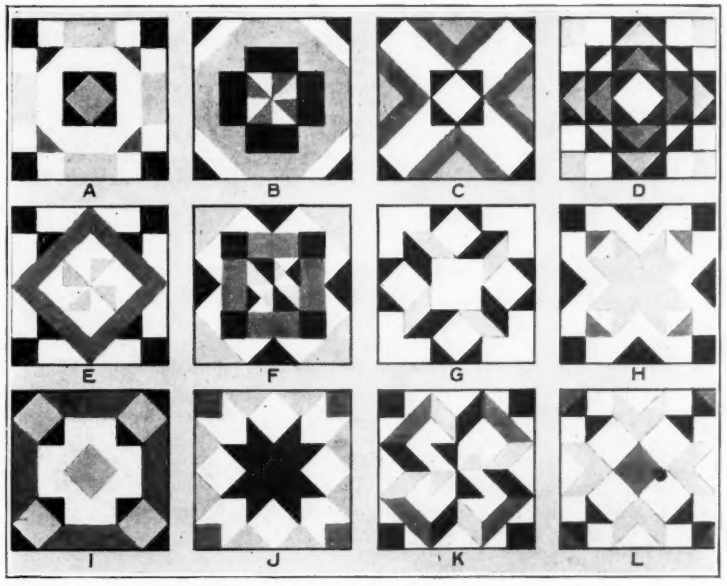
[1]The use of a gas flame is not applicable where flammable vapors or dust are present, as in a rubber spreading or cement department.

Rubber Floor Designs

ALLAN WILLIAMS

VARIOUS designs are employed to carry out the beauty of rubber flooring which is being more appreciated as time goes by. A great number of designs can be carried out by the use of eight to fifteen plain colors and the same number can be obtained in mottled effects. Rubber flooring is still in its infancy although the old interlocking designs were used as early as 1893. In those days the difficulty was to develop a safe method of attachment to the underfloor. The price of rubber was expensive, although labor was cheap. The method of production made the cost of rubber flooring high which naturally prohibited its use to any great extent at that time. Today, competition and quantity production have lowered the cost, and the competition of poorly made substitutes has in many ways improved the present status of rubber floors.

Color dyes that stand the effects of water and sun are now used in rubber flooring. Certain compounding ingredients give it a gloss, and with proper care a finished floor needs no waxing or polishing. Fabric has been introduced to toughen rubber flooring which is second to none when put to hard usage. The advantages of good quality rubber flooring are slowly but surely being appreciated by the public.



These Twelve Rubber Flooring Patterns Were Designed for This Article by Allan Williams

Rubber flooring should be accurately cut and not vary more than 1/64 of an inch. If the outlines are straight and laid out correctly there should be no variation in the pressure, and blistering or open joints will not occur. The different sizes of tile can be cut with the aid of a jig on rubber-cutting or paper-cutting machines. They should never be cut so that the under surface projects further than the top surface of the tile as this would cause an open joint. Rubber flooring that has been given 2,000 pounds pressure per square inch in the molds is subjected to an expansion greater than 1,200 pounds per square inch when laid in the waterproof cement. This contains a solvent which causes the rubber to soften slightly. The quality of high-pressure rubber flooring is better than low pressure as it is more condensed, and, although a little harder and stiffer, it will stand more abuse and will not check so soon.

The thickness of the tile is important, because after the rubber flooring is laid it is rolled with a roller weighing about 100 pounds, and should one tile be thicker than the other it causes an uneven surface, or, should the lower tile be of a light color, dirt will collect there unless special attention is given to the joint when cleaning.

A great many designs can be employed with various small squares and oblongs, also halves and quarter tiles. Designs A to L shown in the accompanying illustration and here described will give an idea of the multitude of designs that can be used.

DESIGN A. This comprises a dark gray tile in the center and laid diagonally with four black half tile around it forming a square. Around this are oblong white tile with white half tile on each corner, making a white color around the square. Four dark gray halves in each corner complete the square. There are four black tile in each outer corner with one white on each side of it, making eight white tile on the outer edge of each unit. Four light gray oblongs on each side, twice the size of the corner square, complete the unit.

DESIGN B. The center contains two white halves, two light gray and four dark gray halves, placed in fan shape, thus making a square. Around this are four black oblong tile, one on each side. Outside of these black oblongs are four light gray oblong tile of the same size, and four light gray half tiles that fit in the corners of the black oblong tile and receive the light gray tile on the outer edge. Four white lozenges with miters pointing away from each other and four black halves in each corner form the complete unit.

DESIGN C. This has a white tile in the center, laid diagonally, and four black halves on each side forming a square. On each corner is a white oblong with the end cut out to receive the square on all four corners, making a cross, laid diagonally. On each side is a dark gray strip forming a triangle and inside of this strip is a light gray half tile which completes the side. In each corner is a black half tile, thus forming the complete unit.

DESIGN D. This can be made with squares and half tile only. A white square is laid diagonally in the center with four black tile on each side, forming a square. To this is added dark gray half tile on each side forming another square diagonally, and on each side of this square are two black halves with the long side of the halves against the square forming a cross. On each end of the cross is a light gray half tile with the long side against the cross, and two black halves filling out to the side of the unit. In each corner is a light gray square and two white squares, one on each side, with a white half and black half filling in, completing the full unit. In this particular design the cutting must attain a high degree of accuracy.

DESIGN E. It contains four light gray quarter tile set in fan shape, and four white three-quarter tile filling out

a square laid diagonally. Around the square is a wide strip of dark gray. On each outer side of the strip is a black half and in each corner is a black square with white filler pieces on the sides to make up the complete unit.

DESIGN F. The square in the center is formed by the use of four squares, two of which comprise two black halves and two light gray halves. The other two squares comprise four quarter tile, two being white, one light gray and one black. On each side of the square is an oblong of dark gray with a black square on each corner making another square. On each side of the square are two white halves, forming a cross outside of the square, with a black half on each side and a light gray half in each corner, forming the complete unit.

DESIGN G. It is composed of a white square in the center and one black and one light gray lozenge in each corner, and in between these lozenges is a white tile laid diagonally with the diagonal point touching both the center square tile and outside of the unit. In each corner are three white squares forming a triangle, with two black halves to fill in the side to make a complete unit.

DESIGN H. The center is a light gray square tile laid diagonally with four light gray three-quarter tile the same size on each side. In each cut-out of the three-quarter tile is a white half tile and a dark gray half tile against it on the long edge. Two white lozenges and a black half tile fill out to the side of the unit, and two white squares and one black square fill out each corner.

DESIGN I. This contains a light gray tile laid diagonally with a three-quarter white tile on two vertical sides and oblong white tile on the horizontal sides to make a cross. In each corner of this cross is a black half and on each diagonal side is a light gray square tile the same size as the center tile and a black half tile in each corner with dark gray filler pieces on each side to complete the entire unit.

DESIGN J. It contains a star effect similar to Design H, but the color is black. On each side is a white square and two light gray halves to fill out the sides. In each corner are two white lozenges, one a right and one a left, with a dark gray square in each corner to complete the unit.

DESIGN K. A square is formed with four white halves, two light gray halves, and two black halves, all the same size, in a fan shape. On each corner of the square is a three-quarter white tile with the cut-out over the corner of the square forming a cross laid diagonally. On each side of the cross is a light gray and a black lozenge forming a chevron, and a dark gray strip connecting each chevron forming an outer cross. On each side a white half fills in to the side, and on each corner two white halves and one black square complete the unit.

DESIGN L. This comprises a dark gray tile laid diagonally and four white tile the same size on each side forming a cross. Two lozenges, one right and one left, form a chevron of light gray with a white filling out to the side of the unit. In each corner one dark gray half, two black halves, and two white squares complete the unit.

In all the above designs four different shades have been used to demonstrate the coloring effect but more could be used in such designs as D, F, K, and L.

Rubber Heels Avert Shocks

Motion picture studies by European rubber heel manufacturers show that in walking a mile the average pedestrian takes 2,095 steps, the point of impact in each being on the back edge of the heel, the latter for an instant sustaining the whole body weight. To wearers of hard-heeled shoes the steps taken in a mile walk therefore constitute a series of 2,095 concussions that are distinctly harmful to the nervous system.

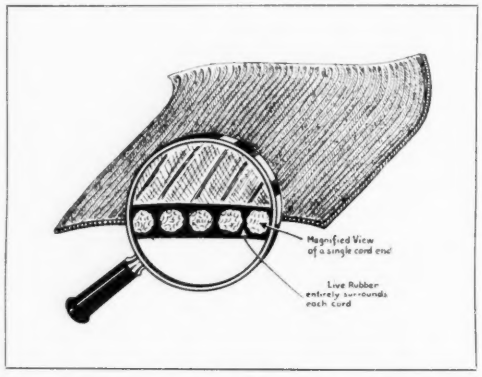
Cord Process Development

Perfect Rubber Insulation of True Spring Cords

THE insistent demand for maximum tire service at consistent cost brings to the manufacturer an unending series of technical problems. How well these are being solved by rubber chemists, technologists, and engineers is evidenced by comparison of the uncertain mileage of pre-war clincher tires built with square woven fabric with the vastly superior and thoroughly dependable road performance of present-day cord tires.

It is well known that the service failure of tires built of square woven fabric was due chiefly to the structure of the fabric which prevented the penetration of the rubber and made it impossible to protect the fabric yarns individually with rubber. This condition resulted in weakening the yarns by frictional heat generated as the tire flexed under load in road contact.

Cord fabric construction obviated much of this difficulty for it permitted better protection of the individual cords. Subsequent research developed a number of methods whereby cords are now accurately spaced in sheets, without the presence of the light cross retaining thread, and each cord can be rubber embedded. A cross section of such a rubber and cord combination in finished sheet form is indicated by the illustration which pictures a section of material as produced by the all-cord process method.



Enlarged Cross Sectional View of All-Cord Process

Viewed as under a magnifying lens this construction is seen to be systematic and regular. Each cord is equidistant and parallel to its neighbor. In fact all are under equal tension and each is surrounded by an even insulation of scientifically compounded rubber of highest quality. This feature prevents the cords from contacting with each other and chafing through when the tire carcass is flexed in service.

The rubber stock holds the cords in perfect alinement and does away with cross or filler threads which would chafe and cut the cords and eventually lead to disintegration of the carcass. Tires built of such fabric offer maximum resistance to sudden blows because the cushioning of the cords in resilient rubber gives rapid distribution of the shocks over a wide area of the tire. Incidental to this type of construction is the perfect flexibility that results in easy riding.

As much study has been devoted to the cotton staple and its fabrication into suitable cord as to the many other features of material and construction. In this all-cord process, for example, a spring cord has been developed possessing 30 per cent greater stretch than ordinary cord without sacrifice of strength. This is an important factor in securing flexibility without loss of strength and enables the tire to withstand constant flexing without breaking or causing separation between rubber and fabric.—*Fisk Mileage.*

Improved Gravitometer

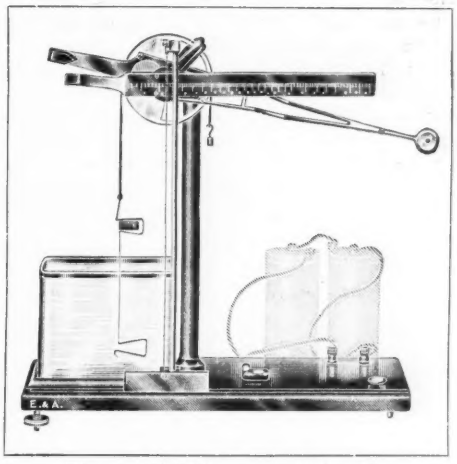


Fig. 1—Weighing Sample in Air

THE first direct-reading gravity balance was invented and introduced to the rubber industry by Philip E. Young[1] in 1913. At this time, most rubber manufacturers did not appreciate that the specific gravity of a rubber compound was as much an element of its cost as the pound price. In other words, the conception of volume cost was omitted from their cost calculations. Materials are purchased by poundage, but goods are sold by the piece. Hence the lower the gravity of the rubber composition the lower its volume cost and the farther a given weight of it will go in making up goods.

The original gravitometer resulted from the evident need of rubber manufacturers for a direct-reading instrument by means of which gravities of samples could readily be determined. This instrument was first developed in December, 1914. Ten years later major changes and improvements that increased its accuracy were made in the instrument.

In operating either of the first two types of gravitometer, it was necessary to bring the index to a given starting point by moving the counter-balancing nut in or out on the threaded member, and this took some time. It was also necessary to elevate the platform carrying the beaker of water in order to immerse the sample.

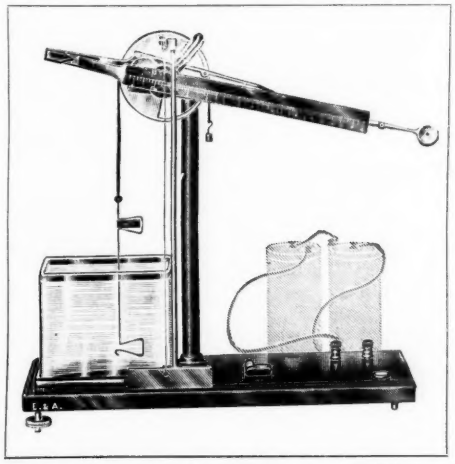


Fig. 2—Scale Adjusted to Beam in Equilibrium

New Type Instrument

The latest type gravitometer, shown in three operating positions, has no elevating platform or counter-balancing nuts, and is described as follows: The ample base carries an upright standard in which are pivot cups for supporting the beam. The graduated scale is also supported on the front face of this upright member and is rotatable about the center line passing through the pivot cups. This scale is attached to a friction member in such a manner that it will stay in any position it is placed and yet it is easily rotatable. The base also has a slot in the front portion extending nearly the length of the base. In this slot slides the index finder which carries a fine wire perpendicular to the base and arranged so that the wire is in light contact with the scale. The base is also supplied with a sensitive spirit level and an electric buzzer. It has also an enclosure to receive the water jar.

The beam, which is supported in the pivot cup, is constructed of aluminum and consists of a drum about four inches in diameter and with a ¾-inch face. Through the exact center of this drum passes the pivot upon which the whole beam rotates. Securely attached to the front of the drum is the aluminum casting which carries, on one end, a circular mirror which has a small red circular index in its center. The center of this mirror is ten inches from the center line of the pivot. The opposite end of the aluminum casting carries a pointed index for use in lining up the scale with the beam.

A tape passes over the face of the drum and is securely attached to the drum in a position exactly diametrically opposite the center of the mirror. The left end of this tape is attached to the double suspension hook and the other end to a counter weight. The upper hook is always above the water level and the lower hook is always immersed.

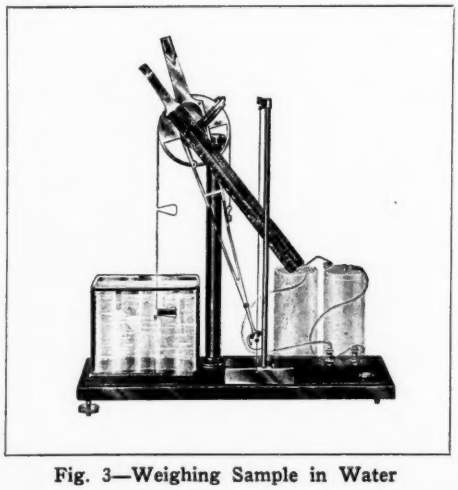


Fig. 3—Weighing Sample in Water

Operation of Instrument

The following brief description of the operation of the instrument will give the reader an idea of its simplicity and the great speed at which it may be operated.

The sample to be tested is placed in the upper hook, as shown in Figure 1, and the weight of the sample moves the beam to a position of equilibrium. The buzzer is operated to overcome friction.

[1] President, Acushnet Process Co., New Bedford, Mass.

The scale which is rotatable about the same center as the beam is then moved until its center line is on the index at left end of the beam. Refer to Figure 2.

The sample is then placed in the lower hook, as shown in Figure 3, which is immersed in the jar of water and the beam moves in a clockwise direction until in equilibrium. The buzzer is operated to overcome friction. The operator then moves the vertical index finder to the position so that its hair line passes through the red center of the mirror. This may be accurately set by placing the vertical index finder so that the image of the hair line when lined up with the hair line itself passes through the red center. The specific gravity is read directly on the scale at the point where the hair line crosses the center line of the scale.

Gravities may be determined at the rate of more than one per minute, making this new instrument of great service to all rubber factories, notably in laboratories, rubber compounding departments, curing and mixing rooms, and control departments where the checking of gravities is an important part of the daily routine work.

Gasket Seating Device

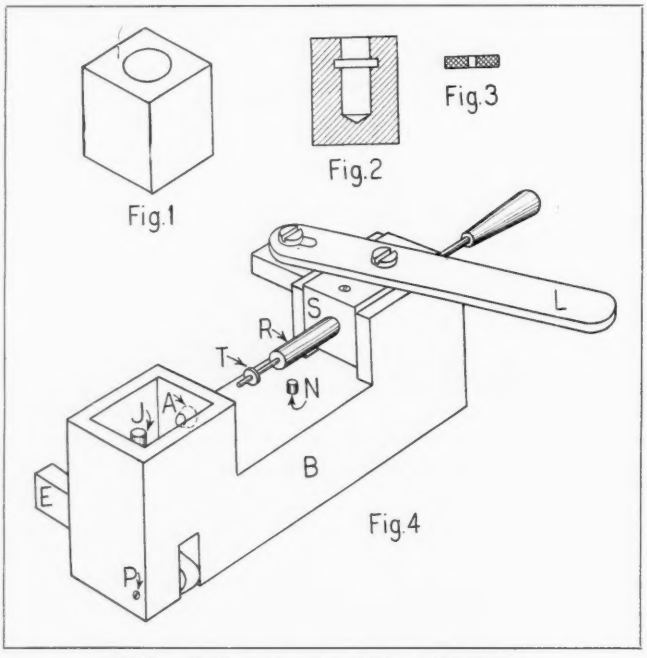
Simple Tool Forces Small Rings in Place

THE familiar electric "Stop" signal light with which automobiles are so generally equipped is operated by the pressure-controlled movement of a rubber gasket or disk measuring ½-inch in diameter and ⅛-inch thick. This circular piece of rubber is located in a rectangular brass block represented in perspective in Figure 1 and in cross section in Figure 2. These blocks serve as valve chambers on an air-pressure line. How one factory solved the problem of seating 40,000 of these rubber disks or gaskets in the somewhat inaccessible grooves provided for them, shown in Figure 2, is explained in the following account.

A $\frac{5}{16}$-inch hole is drilled in from one end of the block and this hole has a gasket groove cut in it at a depth of "one diameter," to receive the soft rubber disk shown in Figure 3. The gasket groove is made a tight fit on the disk in order that the latter will not blow out under a pressure of 60 to 80 pounds. The whole proposition was as neat a production job as anyone could have wished, and there was no difficulty until these disks were inserted. Right here an absolutely blank wall was encountered. The planning department failed completely, as did the workmen in the shop who had ideas on the subject and were given a chance to make up apparatus that would carry them out. These little pieces of soft rubber refused to be coaxed into position, wet or dry. They would squirm into every position but the right one, regardless of tools and patience. It was in fact a triumph for a man to get three in place in an hour, and the general conclusion was that the designer of the valve stumbled unwittingly upon a most engrossing puzzle.

A chance suggestion that glycerin soap be used for a flux, coupled with the device shown in Figure 4, was the ultimate solution of the problem that had held up the job for weeks. When the disks were dipped in a solution of glycerin soap, the low coefficient of friction which rubber has when wet was reduced almost to zero. The disks were almost too slippery to pick up.

The following explanation, in connection with Figure 4, will make evident the method by which the baffling job is successfully accomplished.



Rubber Gaskets Are Seated by this Device

The base *B* is gripped in a bench vise, with parts and the soap pan alongside. The brass blocks are dropped, one at a time, in the pocket just fitting them in the left-hand end of the base. An ejector-pin *J*, pivoted on the screw *P* and operated by lever *E*, removes the blocks when gasketed.

In the mechanism, the rod *R* and the hole *A* are $\frac{5}{16}$-inch diameter, the same as the hole in the brass block, and it is on the same axis when the block is in its pocket. The rod *R* is fastened in the slide *S* which is moved by the lever *L*, grasped in the left hand. Inside of *R* is a piece of ⅛-inch drill rod operated independently by the handle at the right and carrying the head *T* soldered near its point, *T* also being of $\frac{5}{16}$-inch size.

In operation, a rubber disk placed against *T* is forced forward into the hole *A*, which has a funnel-like entrance. Usually, the head *T* carries the disk inside, but if not, it lodges between *T* and *R*, and then *R* finishes the work. When the slide *S* strikes the pin *N*, *R* has pushed the rubber about $\frac{1}{16}$-inch beyond its final position. By pushing with *R* and pulling with *T*, the disk is guided into its recess and it will not displace when *T* is withdrawn through the small central hole. A production of 100 disks positioned in an hour is averaged with this equipment.

A. C. S. Boston Rubber Group

The next meeting of the Boston Rubber Group will not be held before next fall. A definite date has not yet been set.

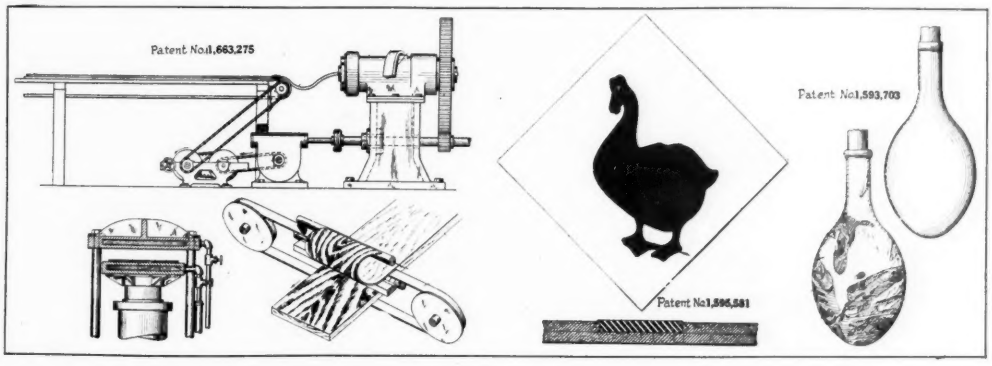
Ornamented Rubber

JOSEPH ROSSMAN

THE following abstracts comprise a review of the processes for ornamenting rubber as disclosed by the United States patents. This is the conclusion of the article that was published in the INDIA RUBBER WORLD, April 1, 1929.

1. Lewis, 38,686. May 26, 1863. This consists in printing typographically or with engraved plates, and transferring printed matter or engravings from paper upon the soft compound of rubber or other vulcanizable gums, and fixing the printed matter indelibly in the surface by vulcanizing.

2. Burchardt, 43,666. Aug. 2, 1864. Before the rubber is vulcanized, chips, fillings, or dust of gold, silver, or any other metal is applied, according to certain patterns or designs, so as to produce on the surface of the rubber articles similar designs formed by the metal dust. To accomplish this the design is made in the mold, and the metal dust or fillings are placed in those parts of the mold which are to produce the ornamental designs on the surface of the rubber article. The rubber is then introduced and cured in the usual manner. Thus any design in yellow, white, or in different colors may be produced on the rubber according to the nature of the metal fillings used in the process.



3. Beck, 90,335. May 25, 1869. The desired color is mixed with pure rubber at a temperature of 120°, each color being mixed and kept separate, and then formed in rolls 1½ inches in diameter and about 30 inches long. The workman selects pieces from the various colors and feeds them between the calender rolls, adding from time to time the various colors in greater or less quantity, and in different places, from right to left and left to right according to his experience, taste, or the required pattern, always keeping a sufficient amount in the rolls to make a continuous sheet.

4. Dunbar and Lothrop, 170,941. Dec. 14, 1875; Reissue No. 8,043, dated Jan. 22, 1878. A method which consists in uniting with a base or body of comparatively low cost, containing a quantity of rubber, an inlaying or overlaying ornamentation of characters of any given material, color, or tint, provided with sufficient pure rubber to enable them to assimilate more or less completely with the base, and be susceptible of vulcanization.

5. Donaldson, 171,106. Dec. 14, 1875. Making rubber handles for dental and other implements, by covering a core with strips of rubber of different colors, placing the core in a mold, tightening and compressing the mold upon it, and then vulcanizing the whole. See group illustration on page 66.

6. Williams, 174,883. March 14, 1876. Pieces of cloth are coated with gum on one side and laid upon a rubber foundation prior to vulcanization. Both surfaces may be made up in like manner, but involving different colored cloths. To obtain extraordinary durability to the inlaid styles, a thread of unvulcanized gum may be applied between the pieces after they have been closely laid, by slightly separating them in bending the mat. After vulcanization all the edges will be firmly cemented to each other, and a net work of gum will be also formed, slightly raised above the surface of the fabric.

7. Traun, Traun and Traun. 228,290. June 1, 1880. The surface of hard rubber is decorated with colored or bronze ornamentation, writing, or pictures and the ornamentation fixed by vulcanization.

8. Mayall, 247,838. Oct. 4, 1881. Coloring or ornamenting rubber toys and other articles comprises making very thin sheets of rubber and colored sulphides of antimony, cutting patches from the colored sheets and affixing them to the surface of the object, and curing the whole together.

9. Aldrich, 283,057. Aug. 14, 1883. A rubber fabric having one or both of its surfaces printed with ornamental designs in ink of a different color from the body of fabric, the ink or compound containing rubber and sulphur, or an ingredient for vulcanizing the rubber when subjected to heat.

10. Burbridge, 510,888. Dec. 19, 1893. Making sheets of variegated rubber consists in building up a block of sheets of different colored compounds, consolidating them by pressure, cutting strips therefrom, twisting and setting the strips, joining the ends to form rings, piling a number of rings one upon another, consolidating them by pressure to form a homogeneous mass or body and finally cutting the sheets therefrom.

11. Murphy, 543,583. July 30, 1895. Multi-colored rubber tiles are made by first semi-vulcanizing the sheets of various colors, then cutting out small pieces of these sheets, laying the sheets side by side to form a tile, interposing between them films of raw rubber and vulcanizing into an integral unit.

12. White, 755,976. March 29, 1904. The method of printing on inflatable rubber articles consists in first stretching the envelope to the same dimensions as it will have when the article is inflated, and then printing thereon, whereby the imprint will return to the same dimensions and form when the article is inflated as the imprint had at the time of printing.

13. Gottlob, 1,113,614. Oct. 13, 1914. Process for the production of colored caoutchouc-like materials, which consists in first treating caoutchouc-like materials with organic azo dyes, and in vulcanizing them after being thus colored by heating with sulphur at the vulcanization temperature.

14. Ditmar, 1,113,759. Oct 13, 1914. A process of producing colored rubber materials which consists in mixing the rubber with organic vat dyes such as thioindigo dye and vulcanizing.

15. Clark, 1,161,614. Nov. 23, 1915. A permanent and integral mark is produced in rubber articles by impressing the projections of a die into the vulcanized rubber surface, such projections being heated to 550 to 600° F., and maintaining the die in position for a few seconds with sufficient pressure to cause the rubber to flow and effect the desired permanent impression therein.

16. Chatelain, 1,209,118. Dec. 19, 1916. The process of forming hollow articles having minute interstices or recesses, and with variously colored or tinted portions, comprises forming the article about a heated core by enclosing it in heated mold sections under external pressure, vulcanizing, stripping the article from the core, finishing, applying colored rubber cement to the various portions thereof.

17. Kempel, 1,215,382. Feb. 13, 1917. Flooring slabs having a mottled rubber surface are made by forming a loose layer of various colored particles of vulcanizable rubber compound, rolling and thereby compacting the layer, and vulcanizing the layer upon a backing under mechanical pressure and heat.

18. Somerville, 1,309,703. July 15, 1919. The manufacture of a decorative rubber article by compounding unvulcanized rubber with a light-sensitive material, forming the compound into the

article desired, subjecting the surface to light rays conforming with the desired design, and exposing the article to the action of heat. For example: to 10 parts of rubber may be added 25 parts of lithopone, 12 parts of Paris white, 1½ parts of magnesium carbonate, 1½ parts of lime, 4½ parts of sulphur, and 2 parts of petrolatum, the compound being formed into the article desired and subjected to sun or artificial light and then vulcanized by heat. In this compound the color of the exposed portion of the article will be russet and that of the unexposed portion will be white.

19. Burke, 1,445,745. Feb. 20, 1923. Producing a distinctive colored marking upon a rubber tire comprises applying a coloring material to a transfer member, locating it upon the unvulcanized tire in a definite relation to a base point, placing the tire in a vulcanizing mold having markings for impression upon the tire, with the base point on the article registered with respect to base points on the mold sections, so that the transfer member will lie in proper registration with the mold marking, and vulcanizing the tire, whereby a combined molded and colored marking is produced upon the tire with the desired registration between them. See group illustration on page 66.

20. Stedman, 1,482,952. Feb. 5, 1924. The steps in making a variegated vulcanized rubber flooring, which comprise separately producing a plurality of color batches, each composed of unvulcanized rubber, compounding ingredients, a cotton or like fiber mechanically reduced to a finely comminuted condition, and pigment, the color controlling pigment in each color batch being of a different color. The fiber being so fine and so thoroughly combined with the colored rubber that when milled with batches of greater quantity and different color which forms a base color, and sheeting out the mass, a vari-colored sheet is produced in which color identities are distinctly retained. The sheet is finally vulcanized.

21. Wing, 1,493,511. May 13, 1924. This comprises the use of reenforcing sheets of vulcanized rubber which can be inserted in the mold to cover hard rubber dust, the whole being pressed and vulcanized to produce the finished article, the reenforcing sheets of vulcanized rubber being grained or colored previous to being placed in the mold.

22. Burkley, 1,496,753. June 3, 1924. The article of uncured rubber is made by marking a non-adhesive material with a transferable material, applying a piece of uncured rubber to the marked surface thereof, applying a solvent to the exposed surface of the uncured rubber, disposing the piece of uncured rubber and its layer of non-adhesive material upon the uncured rubber article, applying heat to cure the rubber, and removing the non-adhesive material.

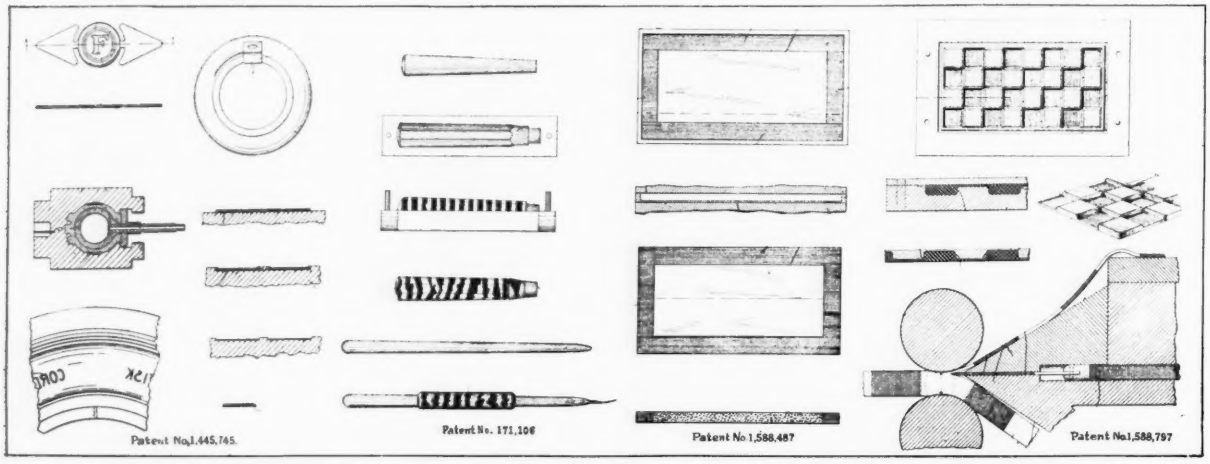
23. Griffiths, 1,516,598. Nov. 25, 1924. Ornamenting rubber sheets consists in removably juxtaposing a sheet of rubber and a smooth flexible backing, applying to the exposed surface of the rubber a thin coating of non-adhesive material of a character which will incorporate with the rubber upon application of heat, applying design-forming material to the coated surface, and finally vulcanizing the sheet.

24. Buttfield, 1,516,843. Nov. 25, 1924. The process of graining rubber compounds consists in mixing but incompletely blending a compound of one color with a plastic compound of a different color, subjecting the compounds to a temperature which will prevent their complete blending, separating the mixed compounds while in a plastic state into a plurality of parts, and finally forcing the parts together to form a compound of contrasting colors.

25. Stedman, 1,531,763. Mar. 31, 1925. The production of rubber sheeting mottled in imitation of various kinds of marble consists in mixing crude or reclaimed rubber with pigments, thereby the grain or fiber in the rubber is drawn into parallel streaks longitudinally of the mass, calendering the mass thus formed to produce a sheet with streaked or veined surface markings, and then recalendering it in a manner to twist the fiber and streaks in the plane of the sheet and blend the streaks into a gnarled mass.

26. Joseph, 1,534,527. Apr. 21, 1925. A sheet rubber fabric ornamented by a positive reproduction of a textile fabric is obtained by impressing a textile fabric upon a sheet of uncured hard rubber, vulcanizing the sheet, producing a fixed negative, arranging upon it colored strips of uncured soft rubber to produce the designs desired upon the fabric, and covering the negative with a sheet of uncured soft rubber. The sheet is then vulcanized to unite the colored strips and the sheet of soft rubber to form a varicolored fabric having on the face the positive design of the textile fabric in which the crossing of the warp and weft threads is sharply delineated.

27. Midgley, 1,544,262. June 30, 1925. A process of marking on rubber goods compounded with sulphur which comprises heating in contact with metallic copper alloyed with some other metal



acting as a diluent and a retarder of the action. An alloy for this purpose consists of 88 per cent copper and 12 per cent nickel. Another consists of 95 per cent copper and 2½ each of tin and zinc. Other alloys may be substituted readily, depending upon the dilution of the copper desired.

28. Hakanson, 1,550,160. Aug. 18, 1925. Impressed molds of vulcanized rubber for making soft rubber articles with surface decoration resembling textile fabrics, are produced by pressing a textile pattern on the surface of an uncured rubber mass and vulcanizing it, leaving a hard rubber mold with impressions and intaglios exactly corresponding to the surface of the textile pattern.

29. Riley, 1,551,847. Sept. 1, 1925. Making a decorated hollow rubber ball which consists in printing an ornamental design upon a piece of thin uncured sheet rubber, attaching it to the tacky surface of an uncured hollow biscuit containing a gas-forming medium, placing the biscuit in a mold and subjecting it to heat causing the biscuit to expand and the decorated sheet to be inlaid in the surface of the biscuit, the sheet being vulcanized to the biscuit.

30. Binmore, 1,552,907. Sept. 8, 1925. A method for making designs in rubber which comprises inking a raised die with a depolymerized rubber ink, drying, placing the die in contact with a sheet of rubber, stripping the sheet and adhering portions of dried ink from the die, and vulcanizing.

31. Meyeringh and Wijnand, 1,559,343. Oct. 27, 1925. A process for the production of rubber dyed throughout, comprises the treatment of raw rubber in sheet form with a solution of coloring matter, the solvent in the coloring matter solution being capable of penetrating into and throughout the rubber, then passing the rubber between rollers under a moderate pressure, and then adding sulphur and vulcanizing with actinic rays.

32. Hoppes, 1,560,472. Nov. 3, 1925. Ornamenting rubber which comprises applying fluid rubber to the surface, then, before this has set and while it is in condition to blend, spraying on the surface additional fluid rubber of contrasting appearance, finally setting the fluid rubbers by vulcanization.

33. Roberts, 1,560,862. Nov. 10, 1925. Making a sheet of

variegated rubber, which comprises superimposing a plurality of layers of different colors one upon the other, causing a vacuum around the layers, uniting them to form a block, and thereafter slicing across the block to form a sheet.

34. Swoboda, 1,576,156. Mar. 9, 1926. Producing a tire casing having a distinctive color contrasting with the color of the casing, consisting of building up a tire carcass with independent and superposed thicknesses of unvulcanized rubber which extends substantially around the periphery of the carcass, and vulcanizing it, whereby the two superposed thicknesses of differently colored rubber are joined together, portions of the outer thickness of rubber being removed to provide openings of distinctive configurations through which corresponding portions of the inner thickness of rubber are displayed.

35. Frood and Sydee, 1,583,545. May 4, 1926. Unvulcanized rubber sheets of the desired color are cut up into small sections which may be of regular or irregular shapes. The mixed colored sections are then dipped or immersed in a solution consisting of a mixture of rubber solution and metallic powder, such as aluminum powder, whereby the various sections become coated with metal coating. The mass is then consolidated into sheet, tile or other form by presses or by passing through a roller type of machine. The sheets are vulcanized and their faces finished by grinding or otherwise removing the surface whereby the metal coating is removed and the variegated colored pattern is exposed, each colored section having a metal border.

36. Miller, 1,588,487. June 15, 1926. A sheet formed of sponge rubber and having each face ornamented by the application of at least one surface coloring penetrated into and integral with the sponge rubber of such face. See group illustration on page 66.

37. Mell, 1,588,797. June 15, 1926. Manufacturing sheet rubber which comprises cutting strips from sheets of different colors, joining the strips to produce a composite sheet having stripes of alternate colors, cutting the composite sheets into strips by cuts crossing the color stripes therein to produce variegated strips, joining the variegated strips to produce a composite stock sheet, and cutting a coextensive slice from the last mentioned sheet while maintaining a uniform condition of non-binding spread of the slice and residue as the line of cut is advanced through the sheet. See group illustration on page 66.

38. Morr and Morr, 1,593,703. July 27, 1926. The method of making colored rubber articles by dipping a form in the rubber solution applying to its surface the colors in fluid state, and inverting the article back and forth before the rubber hardens to cause the colors to mingle with each other and with the fluid rubber, and vulcanizing the completed article in an acid cure. See group illustration on page 65.

39. Rock, 1,594,382. Aug. 3, 1926. Rubber having a roughened surface is produced by passing a smoothly calendered sheet through chilled rollers, and subsequently vulcanizing it without destroying the roughened surface formed by the rollers. The roughened surface resembles stucco, or it may be termed "stippled."

40. Stedman, 1,595,581. Aug. 10, 1926. Manufacturing interior decorative units which includes preparing a two-ply sheet of fiber reenforced rubber, cutting out the desired shape from one ply leaving an opening with the other ply as a backing, cutting out the same figure for an inlay from another piece of fiber reenforced rubber, slightly thicker than the ply in which the opening has been cut, inserting the inlay loosely, and vulcanizing it to the sheet in a mold under sufficient pressure to produce a smooth inlay surface on the decorative unit. See group illustration on page 65.

41. Stein, 1,603,812. Oct. 19, 1926. Forming striped rubber sheeting which comprises maintaining a supply of rubber in contact with the face of one of a pair of rolls and a different supply in contact with the face of the other of the pair of rolls and a different supply in contact with the face of the pair of rolls, forming a plurality of strips of rubber from the first supply, and leading these strips in contact with the first roll to the bite of the rolls, forming a plurality of strips of rubber from the second supply and leading these strips in contact with the surface of the second roll through the bite of the rolls, the strips from the different supplies being arranged in alternation, and at the bite of the rolls, exerting pressure on the strips to cause their adjacent edges to unite to form a continuous sheeting.

42. Stedman, 1,605,572. Nov. 2, 1926. The method of making a variegated, reenforced rubber flooring from uncured rubber containing cotton fiber in the form of yarn or thread, comprises sheeting the rubber, simultaneously shredding the fiber, distributing it evenly throughout the sheet, adding the fiber-bearing sheet to a color compound as the reenforcing ingredient thereof, forming a color stock therefrom, and then producing a variegated, reenforced sheet by mixing a plurality of color stocks together.

43. Mell, 1,611,218. Dec. 21, 1926. The process of manufacturing patterned sheeting from rubber, comprising the steps of forming two sheets from different colored rubber masses, impressing without projections in accordance with the desired design, bringing the sheets together with the recess and projections thereon in mating relation whereby a composite sheet is formed, dividing the sheet along a plane located between the outer surfaces of the composite sheet, and thereafter vulcanizing the rubber.

44. Housekeeper, 1,612,724. Dec. 28, 1926. In the method of making a grained sheet of unvulcanized rubber, comprising feeding a mass of milled rubber between calender rolls and simultaneously feeding unvulcanized rubber of another color between the rolls to produce a streaked calendered sheet, making a relatively thick slab from a plurality of layers of this streaked sheet with the grain thereof extending in the same direction, and slicing off sheets from the edge of the slab in the direction of the grain of the colored streaks.

45. Mell, 1,619,359. Mar. 1, 1927. Making variegated rubber sheeting which comprises so mixing together a plurality of rubber masses of different colors, at least one being plastic, as to produce a mass of chance design in details of color arrangement, sheeting the resulting mass by rolling pressure, subjecting the resulting sheet to vulcanization, and slicing the resulting sheet into a plurality of thinner sheets.

46. Mell, 1,634,955. July 5, 1927. Steps in making patterned rubber sheeting which comprises forming a matrix of soft rubber composition, filling the interstices of the matrix with a different soft rubber composition by flowing it thereinto by pressure and slicing the resulting structure into a plurality of sheets by cutting it throughout an extended plane passing through the two compositions, the method including a vulcanizing step by which the two compositions are united.

47. Mell, 1,635,684. July 12, 1927. The method of making decorative sheeting which comprises holding in spaced relation a plurality of design elements of stiff sheeting material, pressing a plastic into the spaces between the same from one side of the assembly while molding depressions in the plastic from the other side of the assembly, filling the depressions with a second plastic, stiffening the plastics, and slicing the resulting composite mass by a cut extending through the several mentioned elements thereof.

48. Whitehouse, 1,637,207. July 26, 1927. According to the invention, instead of the rubber being extruded in the form of a complete annulus or a single layer, it is extruded in strips and the strips immediately after extrusion are united at their edges to form the complete tube. By this method, tubes can be composed of strips of different qualities, kinds or colors, and either straight or spiral in the cases of tubes.

49. Mell, 1,663,275. Mar. 20, 1928. The process of producing a grained rubber article which comprises passing two rubber compounds of different colors through an extruding machine together to produce an internally grained strip and removing rubber from the strip to expose the internal grain thereof. See group illustration on page 65.

50. Bridgwater, 1,663,436. Mar. 20, 1928. The method of coloring rubber which comprises mixing rubber or rubber-like materials with a vulcanizing agent and with the sodium salt of the azo compound obtainable by coupling diazotized 2-chloro-5-toluidine-4-sulphonic acid with beta-naphthol.

Making Ebonite Better Insulator

Hard rubber's dielectric quality can be greatly improved if the proteins in the latex used be first destroyed with caustic alkali, says W. W. Nuttall, British chemist. Tests have shown that breakdown voltage of hard rubber can through such treatment be raised 300 to 400 per cent. It is assumed that protein is an undesirable constituent of latex, at least where the rubber product must afford a high degree of electric resistance, seemingly preventing maximum polymerization of hard rubber during vulcanization; and it has been observed that organic compounds which are the most effective insulators are those employed in a very high state of polymerization, or degree of molecular association. It is also noted that the proportion of sulphur in hard rubber is directly related to the electrical properties of the latter. U. S. Bureau of Standards tests are cited as showing that the maximum dielectric constant is reached with a sulphur content of 10½ per cent, after which the dielectric constant falls to a minimum with the sulphur content at about 19 per cent.

SPRENG BALLONGEN IS THE DANISH TITLE FOR A GAME WHICH translated means "bust the balloon," and a merry and exciting game it must be. Hundreds of inflated toy balloons are scattered over a race track upon which automobiles are driven, each driver attempting to burst the most balloons. How the referee makes his decision is beyond us!

Causes of Variation in Plantation Rubber Plasticity

The following is quoted from a report of the London Committee of the Ceylon Rubber Research Scheme on the results of investigations carried out at the Imperial Institute.[1]

In view of the demand for rubber of uniform plasticity, the question of the extent and causes of the variation in the plasticity of plantation rubber is receiving considerable attention both in Java and Ceylon. In tests carried out at the Imperial Institute marked differences were found in the plasticity of samples from a number of Ceylon estates and a detailed study of the causes of this variation has been commenced.

Specimens of rubber for use in these investigations were specially prepared in Ceylon and six months later were tested at the Imperial Institute by the London staff of the scheme by the methods described in the *Bulletin* (1927, 25, 229).

The samples consisted of crepe prepared by (1) keeping the coagulum in the serum for different periods before rolling; (2) passing the coagulum through the rollers for different numbers of times; (3) adding different amounts of sodium bisulphite to the latex; (4) coagulating latex of different dilutions; and (5) passing dry crepe through different types of rolls to convert it into blanket crepe.

A short summary of the results obtained at the Imperial Institute, may be found useful. They indicate that some of the methods of preparation employed have a marked effect on the plasticity of the rubber as shown below:

Treatment	Effect on Plasticity
Keeping coagulum in serum (maturation).	Marked decrease.
Passing coagulum through rollers for different numbers of times.	Marked increase when coagulum is rolled excessively.
Addition of sodium bisulphite to latex.	Marked decrease.
Coagulating latex of different dilutions.	Little effect.
Passing dry crepe through different types of blanketing rolls.	No definite conclusion.

The period during which the coagulum is kept in the serum before rolling and the amount of bisulphite added to the latex appear to be two causes which may effect the plasticity of commercial grades of rubber. These conclusions are provisional and require confirmation, but it is evident that it will be necessary to pay considerable attention to both these points in future investigations.

It has also been shown incidentally in the course of these experiments that drying crepe in hot air causes a considerable increase in plasticity. This is of importance in connection with the preparation of blanket crepe and also suggests a reason why smoked sheet is usually more plastic than air-dried sheet. These questions are still under investigation.

Conclusions

The results of experiments described in this report indicate that six months after preparation:

1. Crepe rubber prepared by machining the coagulum 3 hours after coagulation is about 80 per cent more plastic than when prepared by machining the coagulum 40 hours later.

2. Crepe rubber is nearly twice as plastic when prepared from coagulum machined more than 20 times instead of the usual number of times.

3. Crepe rubber is about 50 per cent more plastic when prepared from latex containing no bisulphite instead of the amount officially recommended.

4. Crepe rubber is only slightly more plastic when prepared from very dilute latex instead of from concentrated latex or latex of normal dilution.

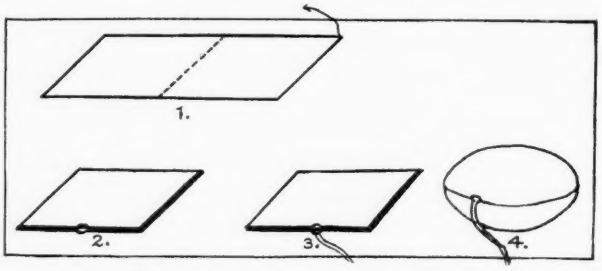
5. Machine-dried crepe may be as much as 50 per cent more plastic than air-dried crepe, and the type of rolls (whether water-cooled or air-cooled) may have an important effect on the plasticity of blanket crepe.

[1] *Bulletin Imperial Institute*, Vol. XXVII, No. 1, 1929. Issued April, 1929. John Murray, Albemarle Street, London, W. 1.

The Emka Process

ABOUT two years ago the Emka method was widely advertised as a process which would do away with all the expensive machines necessary for the preparation of rubber. Since then very little has been heard about the efficiency of this method or the quality of the rubber thus obtained. Yet the idea, which forms the base of this method, is important enough to give here a short description, taken from an article by E. A. Hauser, in *Encyclopédie du Caoutchouc*.

The rubber is coagulated in the same way as smoked sheet rubber. It is then evenly stretched by hand until it looks like a fine sheet, and held in running water to eliminate all acids which adhere to it. Next the sheet is folded as shown in Fig. 1 and the edges pressed together with the fingers until only a small opening is left (See Fig. 2) large enough to insert the tube of an ordinary hand air pump (See Fig. 3). Then the bag is filled with air, the thickness of the rubber depending on the degree of inflation. After that the small opening is closed and the rubber bag is allowed to dry, which will not take longer than a couple of hours. When the air is let out, the deflated bag is cut into pieces which are then ready for shipment.



Illustrating Steps in Emka Process

The method here described can also be applied directly to the manufacture of sundry rubber articles for cold vulcanization. It would even be possible to make it a pure native industry. Note, however, that the constant variation of thickness and also the incomplete drying of the sheet bag, (noticeable from the formation of acids during cold vulcanization) still form inconveniences.

Rubber Shoes Hygienic as Leather

That rubber boots and other rubber footwear are quite as hygienic as leather, as well as being warmer and absolutely dry, is contended by a medical authority in the British press. The writer ridicules the claims of the "nothing-like-leatherists" that leather not only allows better ventilation but also has the property of absorbing body moisture while excluding eternal dampness; and he advises those susceptible to rheumatism or other ills aggravated by damp feet not to be deterred by the ancient claim about rubber "drawing" the feet, from wearing dry and comfortable rubber footwear. As for the ventilation of any kind of footwear, it is held that it is effected through the tops rather than through impermeable soles and uppers.

Factory Problems

A. T. HOPKINS[1]

¶ *Material, labor, and expense make up factory costs. How to reduce and control them is the question.*

¶ *A sensible cost system is essential to budget control of the rubber business. It insures a reasonable profit by making every dollar work harder.*

¶ *Rubber companies need to exert themselves to lift the stigma that rests on the whole industry, in the minds of the investing public.*

PRODUCTION having been determined and tickets arranged for a reasonable period, subject to the daily changes due to customers' requirements, the next thing is to consider materials. Material costs in the rubber business are almost always the large costs, and specifications are the controlling factor. Specifications bring together the accumulated experience and judgment of the industry and the factory. It has been suggested that quality can be improved and cost reduced by attention to the balancing of the piece of goods. Compounding has an important bearing on material costs. Prior to Arthur Marks and the chemists, compounding was a mysterious art kept under lock and key, but now is open to all the world. The fundamental principles may be stated: low gravities where goods are sold by the piece or foot; the proper amount of plasticity to keep down power cost and make for easy handling in manufacturing; and proper cure for the most satisfactory results. A weekly inspection and analysis of defective goods rejected in the factory and returned from customers will lead to changes in specification and methods of manufacture. All goods should be inspected and weighed. Underweights mean the goods are not to specification, and may not give satisfaction. Overweights mean reduced profits.

Labor costs are an important part of the total cost of goods. Too many small factories are on day work almost entirely, because of various reasons: the volume of business may be small; the variety of goods may be large; the planning and routing may be poor so that the worker cannot be kept supplied continuously with materials; the lack of proper time-study of operations; fair rates may not have been set—standard rates should be set on all operations and used in costs and checked with the payroll so as to be sure the labor costs as figured are not exceeded. Another advantage of piece work is that any labor that can be charged direct to the job reduces the amount of overhead. Great progress has been made in recent years in reducing labor costs by the design and use of automatic or partially automatic machinery. Such machinery makes better and more uniform goods usually, and leads to great reductions in labor costs. Tire machines, heel trimmers, hose and belt making machines, and many other devices will occur to us.

Expense varies from one hundred to two hundred per cent of the labor. It includes non-productive labor, power, light, and heat, interest on invested and borrowed money, taxes and all other items that cannot be charged directly to cost of goods. The investment in bricks and mortar is usually too large by far, and a study of proper routing, and the use of modern machinery, and a reduction in inventory will help it. The time to study this is when business is rushing and the departments crowded with orders. Equipment is rarely used to capacity and heavy machinery like that in the mill room should be run continuously.

Non-productive labor will stand a lot of study. Small departments and small factories can frequently be put on a gang piece-rate, the entire department including foremen, truckers, helpers, and productive labor being put on a rate for the total production, which payroll is divided proportionally. The first effect of this is to reduce the number of employes, so there will be more money to divide. In effect the workers get rid of the drones. A lot of money is wasted in departmental expense. This can be cut frequently in half by the establishment of departmental budgets and weekly or monthly reports of the cost of supplies and repairs. It is helpful to price requisitions, so each foreman knows the cost of what he asks for.

Waste accounts for a very real loss. This is largely a matter of housekeeping and can be helped by training. A walk through almost any rubber factory would show unnecessary waste. The worker drops stock on the floor where the occasional sweeper finds it, and sweeps it, covered with dust, into the rubbish heap. If each worker were required to clean his own space, there would be less waste of this sort. Many factories carry an inventory of slow-moving raw material, large amounts of goods in process, and finished goods amounting to 20 to 50 per cent of the working capital, and this material is usually deteriorating. The compound room frequently shows bins of dusty mixed stocks that have not been moved for months. A salvage department to have charge of all dead and slow-moving material will concentrate attention on the problem and lead to better results. Many small companies do not turn their capital frequently enough. This condition can be helped quite as much by attention to inventory as by increased sales.

Power costs can be greatly helped. The average factory manager knows he pays for a lot of coal but does not study the problem, when a little thought and care might cut his coal bill in half. Pipe covering will deliver dry steam to the vulcanizers and presses with the help of steam traps and the returns taken back to the feed water heater and boilers again. The water bill can be halved by proper handling of the cooling water. When the power used is sufficient, it will pay to install a modern steam turbine, generate the electric power, and use the exhaust steam for vulcanizing and heating.

This all leads to the subject of costs. The large companies have their own problems in this respect, but the small companies fail at this point very frequently, and yet a cost system is easy to install and check up. By the help of the specifications, the theoretical cost of an article in material, labor,

[1]Head of A. T. Hopkins & Associates, 10 State St., Boston, Mass.

and expense can be determined and then lots checked for actual cost as frequently as seems necessary. One man can handle the costs for a small factory. These can be used as the basis for a monthly profit and loss statement. Rubber securities have a black eye in the public mind and it is difficult to find any public money for rubber companies. We will all admit that the crude rubber situation has been a trying one, but the companies that have used the best methods and judgment have made satisfactory profits in spite of it. Those interested in rubber companies should see to it that sound business principles are applied, and the results will be entirely satisfactory.

Consumption of Crude and Reclaimed Rubber

THE total number of separate establishments reporting in 1928 was 481 of which 474 reported consumption of crude rubber and 352 reported consumption of reclaimed rubber. Seven factories which reported consumption of reclaimed rubber used no crude rubber. Consumption statistics are shown by states in the following table.

Ohio, the leading state in rubber consumption, used 55.39 per cent of the total crude rubber, and 45.37 per cent of the reclaimed rubber. Massachusetts, with 9.19 per cent of the crude and 12.64 per cent of the reclaim, ranked second. Next in order in consumption of crude rubber come Wisconsin, California, Michigan, New Jersey, Maryland, Connecticut, New York, Pennsylvania, Indiana, and Rhode Island. The Akron rubber district, including Akron, Barberton, and Cuyahoga Falls, used 496,571,823 pounds of crude rubber, or 50.7 per cent of the total.

United States Rubber Consumption by States

States	Total Factories Reporting	Crude Rubber—Consumption Pounds	Crude Rubber—Number Reporting	Reclaimed Rubber—Consumption Pounds	Reclaimed Rubber—Number Reporting
Mass. & Maine	56	89,962,854	56	63,118,994	40
Connecticut	30	31,347,727	30	17,522,631	19
Rhode Island	17	14,857,810	17	9,433,506	16
New York	47	25,498,575	46	20,572,278	29
New Jersey	52	35,497,408	51	34,703,790	38
Pennsylvania	39	24,850,982	38	18,289,699	27
Delaware & Md.	9	34,566,950	9	10,629,715	8
N. C., Va. & W. Va.	6	4,323,768	6	696,336	5
Ga., S. C. & Texas	7	453,155	5	210,819	7
Ohio	99	542,238,362	99	226,642,584	63
Indiana	17	19,821,407	17	9,211,486	16
Illinois	27	9,671,272	27	9,124,971	21
Michigan	11	41,551,153	11	23,074,852	11
Minn. & Wisc.	14	47,050,691	14	21,495,795	12
Kans. & Mo.	9	5,975,249	9	6,214,295	6
Iowa & Nebr.	8	2,765,967	8	1,528,354	8
Colo., Oreg. & Wash.	9	2,928,277	9	6,213,907	6
California	24	41,767,022	22	17,680,303	20
	481		474		352
Total reported consumption		975,128,629		496,162,315	
Equiv. in long tons		435,325		221,501	
Estimated not reported		1,675		1,499	
Total consumption, long tons		437,000		223,000	

NOTE—From Special Circular No. 2,301, Rubber Division, Department of Commerce, Washington, D. C.

Accident in a Heater Room

In turning on the hydraulic system to raise a heater ram the valve stem was stripped making it impossible to stop ascent of the ram. The heater was loaded at the time. The molds toppled over and fell all over the room, fortunately, no one was injured. Imagine what might have happened if a workman had been in the vicinity of that shower of molds. Have you had any similar trouble? How did you handle the situation? Even if this never happened at your plant think it over and give us the benefit of your experience. What positive preventive measures can be taken? *Rubber Section, National Safety Council.*

Rubber Division A.C.S.

Akron Rubber Group

THE Akron Group of the Rubber Division of the American Chemical Society has announced the following program for the year. Every effort is being exerted to increase the active membership and attendance at the meetings, and to have programs of the highest order of excellence. The program committee, headed by R. R. Jones of The Firestone Tire & Rubber Co., is planning an interesting series of meetings. The symposium plan which was used throughout last year is to be continued.

The year will be devoted to consideration of engineering problems involved in the manufacture or use of rubber goods. The first meeting of the year will be held May 20, at Goodyear Theater. The subject will be "Steam Power Engineering." (1) The Power Requirements of the Rubber Factory. (2) The Generation of Power. (3) The Utilization of Power in (a) Mechanical Work (b) in Vulcanization. The general topic of power generation will be covered by R. J. Gaudy, a specialist in power engineering. Other speakers will be announced later. The committee on arrangements promises a fine dinner for the occasion. Every technical man in Akron and vicinity is invited.

The plans for later meetings include one for discussion of safety engineering, probably including fire and explosion hazards and the handling of toxic materials. Another evening will be spent in a discussion of the principles of tire and mold design, and at later meetings rubber as a structural material will be considered.

Westinghouse Lighting Institute

Depicting the application of electric light to all phases of life, commerce, and industry, the Westinghouse Lighting Institute will be opened in Grand Central Palace, New York, N. Y., the latter part of May. This permanent institute for the advancement of the art of modern lighting will be conducted under the auspices of the Westinghouse Lamp Co., a subsidiary of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

The opening of the institute will be coincident with the opening of the convention of the National Electric Light Association in Atlantic City and the inauguration of Light's Golden Jubilee.

The mark of differentiation of this institute of applied lighting from that of an ordinary exhibit is that is a permanent institution that will be an ever-changing demonstration of modern practices of artificial illumination.

Reclaiming with Rubber Oil

French rubber reclaimers are experimenting with a process in which rubber oil is used for extracting rubber in the form of a solution, after the fabrics have been destroyed with muriatic acid. The scrap rubber is "cracked" in a retort at 750-850° F., and the oily distillate obtained is largely heveene. While the reclaim produced is said to be tacky and to oxydize easily, the oil is said to be used with success in reclaiming fabrics from the beads of old casings. In such process the beads, cut into small pieces, are put into a closed vessel fitted with agitators and heated with steam jackets to 100-150° F., and while the agitators are revolved at from 20 to 30 revolutions a minute for about one day the oil completely dissolves the rubber. The fabrics are then taken out and put into another agitator vessel, washed with fresh rubber oil, and centrifugated. The cotton, being of high quality, may be torn in a special machine and used again as new material.

Fig. 1—Lathe Cut Friction Tape

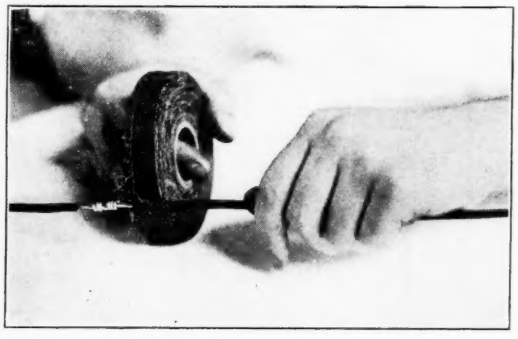


Fig. 2—Lathe Cut Tape Applied to Wire Splice

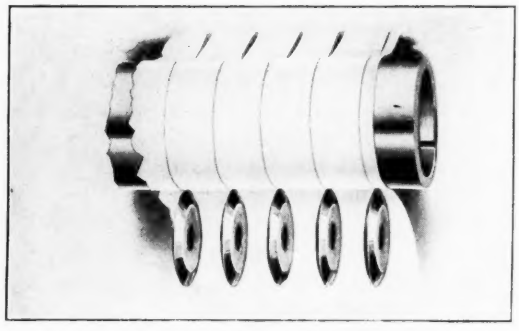


Fig. 3—Camachine Cutting Principle

Fig. 4—Frayless Friction Tape

Frayless Friction Tape

ONE of the interesting, if not the most important, group of processes in the manufacture of electrical friction tape includes the methods of properly stripping and winding the sticky rubber impregnated fabric material and cutting it into finished rolls. Despite the significance of this matter, many friction tape manufacturers consider only the insulating and adhesive qualities of their product, and disregard the manner in which it is wound and cut into rolls.

The dielectric strength or the insulating property is the one chiefly considered by consumers desiring their electrical work to be guarded against possible electrical leakages or short circuits. The adhesive quality of tape is also desired by all practical workers. Every electrician is familiar with the roll of tape which frays and binds at its edges, causing it to tear, making a workmanlike job impossible.

The old method of making roll friction tape is to rewind the coated fabric full width into a roll of desired diameter on a paper core. This is placed in a lathe and sliced into sections by pressing a sharp-pointed knife through the material and core.

This method of cutting makes excessive end waste and calls for special care and skill by the operative to avoid producing more or less seriously imperfect work. Otherwise the edges of the tape are liable to become mashed and sealed together in the act of cutting.

A damaged roll of this sort is pictured in Figure 1. When an attempt is made to unwind such a roll it is very liable to stick at the edges, tear, and pull away with a frayed edge. This condition precludes the possibility of making a workmanlike job, and the inevitable loss of material.

For electrical work, it is essential that the roll of tape unwind evenly without sticking, tearing, or fraying at the edge, as friction tape is usually applied to a wire splice directly from the roll by means of revolving the roll around the wide. If the tape frays and binds at the edges, a poor job of taping the splice is sure to result, see Figure 2.

Volume production of friction tape of the frayless variety so much desired is attainable on the type of machine which cuts the web of impregnated material against a hardened steel roller by means of the pressure cut. The web of rubbered fabric is brought from the saturating machine or calender and is machine cut, edges sealed, and wound evenly, ply by ply, into a number of rolls of any desired width, all in one operation. Moreover, the same machine is used also for cutting paper cores on which the required widths of tape are wound. The cutting principle employed in this machine is illustrated in Figure 3. Its semi-sharp cutting wheels are shown pressed against the rubber or friction-tape material backed by a hardened steel roller. A number of strips are perfectly cut at once. Each ply is cut, its edges sealed, and then wound into separate rolls. Therefore every ply will unwind as easily and evenly as it was originally wound into individual rolls, see Figure 4.

Friction tape rolls that are produced by this method permit the user to apply the stock freely and to complete a taping job with full satisfaction and without waste.

NOTE—Data and pictures from Cameron Machine Co., 61 Poplar St., Brooklyn, N. Y.

EDITORIALS

Drift from Congested Centers

SO deep-rooted is the tradition that manufacturing can be efficiently conducted only in great populous centers, where a labor surplus exists and workers know only a factory atmosphere, that the placing of main or auxiliary plants, as of great rubber works, in the sparsely-settled agricultural South is still looked upon with misgivings. Yet famous old fabric-weaving concerns have in the recent past moved bodily from New England to the South and have found the new locale more advantageous. So, too, will it be with rubber and other manufacturers. Their apparent pioneering is but symptomatic of a growing trend toward the decentralizing of industry and its transference in large part from congested centers to locations where raw material is quite as, if not more, accessible, help more contented if not at first so plentiful, climatic conditions more favorable, and power, if not at once so ample as in huge urban communities, at least soon available through modern interlocking electrical super-power systems.

* * *

Meteors Versus Pluggers

SOME manufacturers claim that the time is not distant when the well-schooled office and sales force will completely replace the less highly-tutored personnel, and there is a plausible reason for such a change. One states that as an experiment he recently set up a branch establishment solely on such basis and, despite the fact that the first force assembled gave such a good account of itself that it could not consistently be changed materially, the second one has proved so much superior in all-around efficiency that he has resolved that henceforth only college graduates—business-minded, of course, —will be hired to fill vacancies or to constitute future staffs.

Yet there are rubber manufacturers who with good reason think that undue stress may be laid on the selection of aides whose main qualification is being well schooled. Not that they minimize the cultural advantages colleges can bestow, but experience has taught them that for many positions equally as much if not greater benefit can be obtained for a concern through special, intensive training of men showing particular aptitude in certain lines. Especially, they have found this to apply to salesmen, the practical, industrious plugger of good address who knows his line well getting much more substantial results than the meteor who, though he may be college-bred and may make a dazzling showing for a while, is just as likely as not to suddenly peter out or quit abruptly if extra demand be made on his talent. The former, they find, can be depended upon in any emergency, but the latter lacks reliability and his high-pressure methods often do as much harm as good.

* * *

Days Off Mean Large Loss

INDICATING the wisdom of watching workers' health, statisticians estimate that the economic loss due to their sickness is almost a billion and a quarter dollars yearly. An occasional day off for an operative may seem insignificant, but if each of the 40,000,000 workers in the country averages but 7 out of the 300 working days, and the average wage is $4 a day, the total loss to production can reach the astounding total of $1,120,000,000 in a year. The loss in potential output is certainly much higher. While it is difficult to compute the share of the billion and a quarter rubber industry in such a huge setback, it is safe to assume that it is very considerable; and herein lies a problem to which welfare workers and efficiency experts may address themselves with the hope of obtaining marked relief for employers and employes.

* * *

Waste Dealers' Inspiring Action

RUBBER manufacturers, who are large buyers of scrap rubber, cotton, and other recovered materials, are much encouraged by the action of the National Association of Waste Material Dealers, which has already done much for better business in its line, in not only denouncing the pernicious practice of unprincipled dealers in frequently refusing to deliver goods at an agreed-upon price when they find they can sell them otherwise at more profit, but also in resolving to stamp out such dishonorable dealings by prosecuting offenders to the limit. There is no reason why the word of a dealer in any material should not be so good as his bond, and the decision of the N. A. W. M. D. that every contract in its line shall be faithfully executed, whether dealers gain or lose, shows a fine appreciation of true commercial ethics.

* * *

ALTHOUGH IT MAY GRIEVE SOME AMBITIOUS MOTORISTS, the truth must be told. Rubber tires can not be driven safely over 240 miles an hour. The designer of the car in which Major Segrave recently sped at the rate of 231⅓ miles an hour at Daytona Beach, Florida, and the tires of which cost about $2,500 apiece, says that if a higher speed than 240 miles be attempted he will have to make tires of steel to stand the terrific pace.

American Rubber Technologists

Technical superintendents, chemists, process and development engineers in rubber manufacturing and reclaiming plants, research, testing and service laboratories are invited to send their biographical data to us for publication

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What the Rubber Chemists Are Doing

Effect of Antioxidants in Typical Rubber Stocks[1]

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A NUMBER of valuable papers have appeared from time to time concerning the use of antioxidants in rubber goods. In most of these papers tensile strength and elongation before and after varying periods of aging in the Geer oven[2] or the Bierer-Davis bomb[3] have been the criterion of merit of different antioxidants. Recognizing the value of these tests, the writer wishes to point out certain additional evidence of the usefulness of antioxidants in the rubber industry as shown by other tests as well as by tensile strength and elongation.

While antioxidants are of value in a great variety of rubber goods, only a few typical examples are given as illustrating the effects of antioxidants in factory production stocks, namely: tire treads, inner tubes, dry-heat-cured goods, specification stocks, and sponge rubber. In these examples agerite resin was the antioxidant used, since this was the first non-accelerating antioxidant available for use in this plant. After nearly five years of production use, a sufficient background of experience has been obtained to judge the value of this antioxidant in practice. Where available, natural aging results are presented along with artificial aging results.

Tire Treads

The effects of 1 per cent of antioxidant on the recipe in a blooming tread stock are shown in Table 1. The stocks used in these tests were mixed and cured in the laboratory, making press sheets 15 by 20 by 0.25 cm. (6 by 8 by 3/32-inch). The cure was controlled to approximate the actual heat treatment that a tread using the same compound received in the factory. Strips of these stocks were aged in the Geer oven, in sunlight, and in dark boxes in a storeroom. In the sunlight one set of strips was exposed without tension at 45 degrees from the horizontal, facing south, during June to September, 1924. Another set of strips was flexed while exposed to sunlight. After three weeks' flexing in sunlight the stock containing antioxidant showed slight surface cracks, while the stock without antioxidant was cracked much worse.

TABLE 1.—EFFECT OF ANTIOXIDANTS ON TIRE TREAD STOCK.

Rubber 53, zinc oxide 15, gas black 20, and sulphur 3 per cent. Accelerator—hexamethylenetetramine.

	No Antioxidant			1 Per Cent Antioxidant		
	Tensile strength		Elongation at break	Tensile strength		Elongation at break
Treatment	Kg./ sq. cm.	Lbs./ sq. in.	Per cent	Kg./ sq. cm.	Lbs./ sq. in.	Per cent
Original	250	3550	690	254	3610	700
Geer oven 7 days	87	1240	440	167	2380	560
Geer oven 14 days	49	700	240	87	1240	430
Sunlight 6 weeks	208	2960	600	232	3300	670
Sunlight 10 weeks	177	2520	570	221	3150	610
Sunlight 14 weeks	159	2260	530	216	3070	560
In dark 2 years, 5 months	184	2620	520	219	3120	570

Sections of two 30 by 3½-inch tires were obtained. One using the above tread compound without antioxidant was cured in November, 1923. The other section was cured in February, 1924, and carried a tread compound the same except for the substitution of 0.44 part antioxidant for an equal weight of rubber in 100 parts of stock. Other conditions of manufacture and storage were identical. After nearly three years of storage in a fairly dark sample room, the stock without antioxidant was weak as shown by "bite" and hand tests. The stock containing antioxidant was markedly stronger. After nearly five years of storage the difference between the two stocks was even greater.

Antioxidants have shown a similar effect in maintaining resistance to tear when aged in the Geer oven and in the Bierer bomb, or in storage in the dark. Abrasion tests after varying periods in the Geer oven have shown the lasting properties of tread stock to be better when containing antioxidant.

Inner Tubes

In high-gum inner tubes tensile strength is probably not so important as resistance to tear. Inner tubes 29 by 4.40 inches were made up in the factory from two stocks identical except that in one case 0.75 part of antioxidant was substituted for an equal part of rubber in 100 parts of the compound, while the other stock contained no antioxidant. One tube of each compound was run approximately 2,000 miles on the dynamometer and tested. Tear was determined on crescent-shaped strips having nicks cut on the concave side. Jaws were fastened to the ends of the crescent and were separated at the rate of 50.8 cm. (20 inches) per minute. The figures represent pounds per 0.1 inch thickness and are averages of transverse and longitudinal tear. The results of these tests are shown in Table 2. It is noteworthy that resistance to tear after running on the dynamometer decreased when antioxidant was not used.

TABLE 2.—BLOOMING INNER TUBE (80 PER CENT RUBBER).

	No Antioxidant				0.75 Per Cent Antioxidant			
	Tensile strength		Elongation at tear break		Tensile strength		Elongation at tear break	
Treatment	Kg./ sq. cm.	Lbs./ sq. in.	Per cent		Kg./ sq. cm.	Lbs./ sq. in.	Per cent	
Original-new tube	147	2090	730	19.2	161	2290	750	18.5
Original-used tube	153	2180*	715*	13.4*	170	2420†	695†	18.6†
Geer oven 4 days‡	129	1840	665	6.8	165	2350	700	16.1
Geer oven 7 days	119	1690	600	5.7	167	2370	700	9.1
Geer oven 10 days	95	1360	565	5.0	185	2630	620	7.8
Geer oven 14 days	53	750	465	3.7	165	2350	605	7.4
2 days oxygen bomb, 70° C., 300 lbs. per sq. in. (21 kg. per sq. cm.)	43	610	475	...	172	2440	695	...
4 days oxygen bomb, 70°, C., 300 lbs. per sq. in.	...	....	....	...	92	1300	600	...

* Tube run 2,113 miles on dynamometer.
† Tube run 1,857 miles on dynamometer.
‡ All oven and bomb tests are on tubes run on dynamometer.

Stocks Cured in Dry Air

Much footwear and a number of specialty stocks are cured in dry air. It is often a very difficult problem to get stocks to cure properly in dry heat without becoming tacky and at the same time not to cure so quickly as to scorch in handling. This surface tack in dry-heat cures is due to oxidation, since it does not occur in steam cures or cures in dry carbon dioxide. Surface tack is greatly diminished or eliminated by the proper use of antioxidants, especially agerite resin. Many stocks now in use could not be handled without antioxidant. Antioxidants also grealy improve resistance to cracking when flexed in sunlight.

Specification Stocks

In many rubber goods artificial aging specifications are imposed. In these cases antioxidants have proved to be of considerable value, often permitting the use of cheaper compounds. The amount of antioxidant to be used in these cases must be determined by the nature of the specifications. In certain cases a minimum acetone extract is specified which will not permit the use of more than a very small amount of antioxidant. A steam hose cover was considerably improved, as indicated by the rack test, by the addition of 0.5 per cent antioxidant on the recipe.

[1] Presented before the Division of Rubber Chemistry at the 76th Meeting of the Amer. Chem. Soc., Swampscott, Mass., Sept. 10 to 14, 1928. *Ind. & Eng. Chem.*, April, 1929, pp. 316-18.

[2] Geer and Evans, *Rubber Age (London)*, **2**, 308 (1921).

[3] Bierer and Davis, *Ind. Eng. Chem.*, **16**, 711 (1924).

Sponge Rubber

A very spectacular example of the value of antioxidants was in black sponge rubber. Samples were taken from factory production, both before and after substitution into the recipe of 0.5 per cent of antioxidant for an equal amount of rubber. These samples were aged in the Bierer bomb at 70° C. and 300 pounds per square inch (21 kg. per sq. cm.) oxygen pressure for two days. Without antioxidant the sponge became so brittle in some places it could not be bent without cracking, while the sample with antioxidant was quite live and flexible. Similar results were obtained with a poorer grade of sponge rubber made in the laboratory and stored in the dark without artificial aging tests.

Effect of High Temperatures

In order to get some measure of the value of antioxidants in stocks subjected in service to high temperatures in the presence of air, a 90° C. air oven test was investigated. Since a short heating at a very high temperature is known to depolymerize or otherwise adversely affect rubber, it was thought that perhaps long heating at 90° C. might produce the same effect. A day in air at 90° C. was found to cause nearly as much deterioration of rubber as a week in air at 70° C. Aging at 90° C. in an oven through which commercial nitrogen was passed gave in several trials almost the same results as aging in air at the same temperature. If, however, the strips were sealed in vacuum or in a small container in purified nitrogen, very little deterioration took place. While long heating at 90° C. in the absence of oxygen produces overcure in some stocks, heating in the presence of air or an inert gas containing a very small concentration of oxygen causes vastly more deterioration.

TABLE 3.—EFFECT OF HEAT AND OF OXYGEN ON TIRE TREAD STOCK.

Rubber 53, zinc oxide 15, gas black 20, and sulphur 3 per cent.
Cured 45 minutes at 146° C. in press.
Accelerator—hexamethylenetetramine.

	No Antioxidant			0.5 Per Cent Antioxidant on Recipe		
	Tensile strength		Elongation at break	Tensile strength		Elongation at break
Treatment	Kg./ sq. cm.	Lbs./ sq. in.	Per cent	Kg./ sq. cm.	Lbs./ sq. in.	Per cent
Original	269	3830	633	262	3730	633
7 days in vacuum at 90° C.	238	3380	530	241	3430	565
2 days in commercial nitrogen at 90° C.	77	1100	353	102	1450	423
2 days in air at 90° C.	71	1010	300	99	1410	400
7 days in Geer oven at 70° C.	133	1890	473	190	2700	562

In the stocks tested, and probably in all well-balanced stocks that are not highly accelerated, the effect of temperatures up to 90° C. in the absence of oxygen is insignificant as compared with the effect of oxygen at these temperatures.

TABLE 4.—EFFECT OF HEAT AND OF OXYGEN ON HIGH ZINC OXIDE TUBE STOCK.

Rubber 48, zinc oxide 45, and sulphur 2 per cent.
Accelerator—hexamethylenetetramine.

	No Antidoxidant			1.5 Per Cent Antioxidant		
	Tensile strength		Elongation at break	Tensile strength		Elongation at break
Treatment	Kg./ sq. cm.	Lbs./ sq. in.	Per cent	Kg./ sq. cm.	Lbs./ sq. in.	Per cent
Original	197	2800	620	198	2810	603
7 days pure nitrogen at 90° C.	196	2700	593	198	2810	600
2 days in air at 90° C.	168	2390	653	215	3060	660
3 days in air at 90° C.	138	1960	627	193	2750	637
4 days in air at 90° C.	98	1390	580	165	2340	633

The effect of air at 70° C. and of air, commercial nitrogen, and vacuum at 90° C. on a tread stock with and without antioxidant is shown in Table 3. Deterioration in two days in commercial nitrogen or air at 90° C. was very great. Seven days at 90° C. in vacuum caused only a slight overcure.

The effects of purified nitrogen in a sealed flask and of air at 90° C. in a high zinc oxide tube stock, both without and with 1.5 per cent antioxidant on the recipe, are shown in Table 4. Results of similar tests with a low zinc oxide tube stock are shown in Table 5, in which 2.5 per cent antioxidant on the recipe was used.

TABLE 5.—EFFECT OF HEAT AND OF OXYGEN ON LOW ZINC OXIDE TUBE STOCK.

Rubber 82, zinc oxide 15, sulphur 2.3, and di-*o*-tolylguanidine 0.5 per cent.

	No Antioxidant			2.5 Per Cent Antioxidant		
	Tensile strength		Elongation at break	Tensile strength		Elongation at break
Treatment	Kg./ sq. cm.	Lbs./ sq. in.	Per cent	Kg./ sq. cm.	Lbs./ sq. in.	Per cent
Original	225	3200	730	226	3220	760
7 days pure nitrogen at 90° C.	209	2970	625	219	3120	613
2 days in air at 90° C.	179	2550	773	230	3270	735
3 days in air at 90° C.	134	1900	710	212	3010	730
4 days in air at 90° C.	72	1030	663	197	2800	740

Conclusion

The results of these tests show that antioxidants are of value in stocks which become hot in service, such as bus tubes, belt frictions, and heavy truck tire treads. It is believed that aging at 90° C., both in air and in an inert gas free from oxygen, will be of assistance in separating the factors of oxidation and overcure in designing rubber compounds for resistance to heat.

Acknowledgment

The writer wishes to express his appreciation to friends for the use of data, and particularly to H. A. Winkelmann for results on sunlight and Geer oven aging on tread stocks.

Stearic Acid Symposium

THE following abstracts of papers read at the March 20th meeting of the New York Group, Rubber Division, A. C. S., were received too late for publication in our April issue. They complete the series of author's abstracts of papers read in the stearic acid symposium.

ADSORPTION OF STEARIC ACID BY CARBON BLACK. The theory is advanced that the fatty acids, such as stearic, which occur naturally in rubber or which may be deliberately added are responsible for the successful dispersion of carbon black. According to Harkins' ideas on dispersions, these acids would make excellent dispersing agents. In the case of carbon black, each particle would be surrounded by a monomolecular oriented film of the acid. In such a case the carbon black is wet by and adsorbs the fatty acid and not the rubber hydrocarbon. The change in heat content when carbon black is mixed into rubber should be the heat of wetting carbon black by fatty acid.

Palmer has measured the cohering voltages of a series of fatty acids. From the relationships developed, the cohering voltage is approximately 8.9 volts. It may be calculated from this that the heat of adsorption of stearic acid is 65 calories per gram. If plantation sheet contains 2 per cent fatty acids—chiefly stearic—and will successfully disperse 30 volume per cent carbon black, the heat of wetting would be 4.7 calories per gram of carbon. This checks Hock's experimental value of 5.1 calories per gram for the above percentage of carbon black in rubber and is in turn checked by Gaudechon's value for the heat of wetting of carbon by fatty acid of 6 calories per gram.

The theory of the dispersion of carbon black should be applicable to other fillers and result in an advance in rubber compounding.—J. T. Blake.

EFFECT OF STEARIC ACID ON CURE. Some comparative data are given which indicate that oleic acid gives a lower modulus in non-loaded, black-loaded, and zinc-loaded stocks when cured with captax. There was a bad acid bloom in the tread stock but none in the other stocks although they were made more sticky. It was concluded that stearic acid purity is more essential for black stocks.

A table is given in the paper showing the effect on combined sulphur, physical cure and stiffness of adding zinc oxide with or without stearic acid. In the absence of zinc and accelerator there is a retarding and softening effect. Small amounts of zinc oxide speed up the cure and increase stiffness beyond effect of black, for example, as a reenforcing agent. Further addition of acid speeds up chemical cure. In the presence of captax and zinc oxide stearic acid gives a tremendous increase in stiffness and physical cure in black stocks and in non-black it gives a softer stock at low cures, rapidly changing to stiffer as cure increases.

In a comparison of the needs of various accelerators for zinc

oxide and stearic acid in extracted rubber, it was concluded that the prime function of stearic acid is to furnish zinc oxide in a suitable form for use by the accelerator. Otherwise it acts as a softener and retarder.—R. P. Dinsmore.

Stearic Acid in Litharge Compounds. An organic acid, salt, or ester capable of forming a rubber soluble lead salt is necessary to vulcanization with litharge. High grade rubbers generally possess enough acidic resin but low grades are frequently deficient, requiring additional acid. This is exemplified by Lapori rubber, a low grade African crude, the curing of which was decidedly improved by various acidic softeners including rubberite, benzoic acid, rosin, zinc stearate, pine tar, rosin oil, zinc benzoate, oleic acid, stearic acid, phenol, hardwood pitch, and lead phenolate. Yet these "activators" of litharge when employed in smoked sheet had a deleterious effect, the crude having sufficient natural acid for activation and a further supply reducing the properties through excess softener.

When litharge is the activator of an organic accelerator, interesting results may be obtained with reference to stearic acid. The litharge-organic stock may be in sharp contrast to the analogous zinc oxide stock. This is illustrated by captax. With zinc oxide it is necessary to add stearic acid to fully develop the curing properties. Corresponding litharge-captax stocks on the other hand, either pure gum or gas black, are substantially uninfluenced by added stearic acid, developing full curing properties either with or without stearic.—J. N. Sheppard.

Effect of Increased Quantities of Stearic Acid on Tread Abrasions. Increased quantities of stearic acid have been claimed to produce excellent tread wear. In this paper it has been shown that 10 to 15 per cent stearic acid on the rubber gives a very low abrasive resistance, as measured by the Grasselli abrasion machine; furthermore, that 30 per cent stearic acid on the rubber gives a value lower than the compound containing 5 per cent. This led to the suggestion that possibly the wax-like properties of stearic acid were influencing the tests. The experiments were repeated using paraffin and it was found that 18½ per cent on the rubber produced an abrasion index lower than previously obtained with stearic acid. The conclusion is that the Grasselli abrasion machine does not truly measure abrasive resistance in the presence of materials which bloom, i.e., come to the surface. Such substances lubricate the surface of the paper during the test.—C. Olin North.

What Is Vulcanization?

Dr. W. F. Zimmerli[1]

THE subject of vulcanization is one which has caused all of us considerable concern at times. In our experiences we have found that the theories of vulcanization do not adequately explain what is taking place, and it is necessary for us to review these experiences in order to determine whether a different conception of what vulcanization is would not assist us in making progress in rubber technology and in fully understanding our various problems.

While we are prone to place rubber in a category by itself, it does have similar properties to other materials in the sense that iron and lead are similar. We accept the formation of jellies in different mixtures as a matter of fact; sometimes with pleasure because we want a jelly and other times with despair or disgust because we do not want it.

Consideration of the properties of jelly, glue, gelatine, gums, paints, lacquers, and greases reminds us that in a great many cases similar phenomena are met with in rubber. In reviewing the properties of crude rubber, we can conceive that this material may be a jell of two different types of hydrocarbons where probably the protein is also an important factor. The term "plasticity" as generally used by the rubber manufacturer is really the character or quality of jell structure in the crude rubber. The different properties of the caucho ball and the latex-sprayed rubbers are examples of this difference in jell structure.

It is possible to produce artificial jells in raw rubber which are similar to the livering of paints or the jelling of greases, and in fact very similar to the rubber condition which we call "scorching." Soaps and certain types of accelerators which I shall mention play an important rôle in this case. The livering of rubber cements may be regarded as very similar to the livering of paints.

In reviewing our experiments on vulcanization we are led to realize from experience that the rubber sulphur reaction product is not sufficient to produce technical vulcanization. Sulphur will react with pure rubber to form a sulphur rubber reaction product in sufficient quantities to produce technical vulcanization when the proper other ingredients are present, but we would no more call this sulphur rubber reaction product a technical vulcanization than we would term reclaimed rubber which contains the sulphur rubber reaction product technical vulcanization.

Early experiences proved that organic acids and bases of some sort are necessary. The acids present in the raw rubber were sufficient to produce vulcanization and the oxides of zinc, lead, magnesium, and calcium were found to give added properties to the rubber.

It is helpful to compare the properties of vulcanizates containing zinc and magnesium oxides with the properties of greases obtained with zinc and magnesium stearates. The fact that zinc oxide forms a salt in the rubber during vulcanization is indicated by the observation that when small amounts of zinc oxide are present this goes into solution in the rubber. A rubber-zinc oxide mix may be a white, opaque mass, but on suitably vulcanizing it, one can get a transparent vulcanizate having only the color of rubber. The accelerators were developed to supply a deficiency in plantation rubber. At first these were basic in character, but at the present time their constitution is heterogeneous. I do not believe that these function, as at first thought, merely as a catalyst in the rubber sulphur reaction. It would seem that they are more like jellying agents, just as certo is a jellying agent (or accelerator) for the setting of fruit jelly. Hence we can discuss the phenomena of undercure and overcure and the action of age-resisters, as average antioxidants are preferably termed, in the light of this jell theory of the vulcanization of rubber.

[1] Representing Roessler & Hasslacher Chemical Co. Abstract of talk to Los Angeles Group, Rubber Division, Amer. Chem. Soc., March 29, 1929.

Columbus Meeting A. C. S. Rubber Division

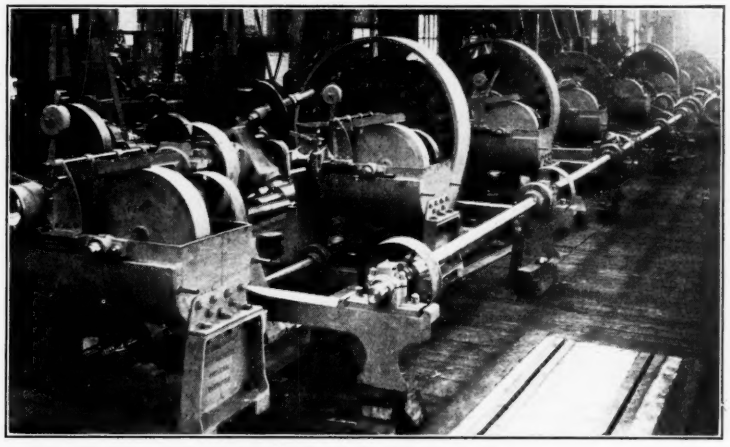
The spring meeting of the American Chemical Society will be held at Columbus, O., April 29 to May 3. The sessions of the Rubber Division will take place Wednesday, May 1, both morning and afternoon, and will be followed by a subscription dinner at 6 P.M. on the same date. The papers to be read before the division are as follows:

1. Thomas Midgley, Jr., and Albert L. Henne. The Effect of the Presence of Magnesium Oxide or Zinc Oxide on the Products of the Destructive Distillation of Natural Rubber.
2. Harlan A. Depew. The Influence of Pigments on Some of the Physical Properties of Unvulcanized Rubber.
3. Ira Williams. The Transformation of Energy by Rubber.
4. Franz D. Abbott. The Testing of Automotive Rubber Parts Assembled under Compression.
5. C. W. Sanderson. The Evaluation of Reclaim in Tread Stock.
6. C. M. Carson. Some Observations on Carbon Black.
7. Philip M. Torrence and Lester C. Peterson. A New Flexing Machine for Rubber.
8. Report of the Physical Testing Committee.
9. Business Meeting.

XX Green Zinc Oxide

A new grade of fine particle size pigment, known as "Horse Head XX Green Zinc Oxide" has been developed for the rubber industry to fill a demand for a zinc oxide yielding high abrasive resistance and possessing excellent factory working qualities. The reenforcing property of a pigment is directly related to its particle size. Since XX Green Zinc Oxide is intermediate between XX Red Zinc Oxide and Kadox in this respect, its reenforcing properties are also intermediate. Its curing properties are such that in compounds such as tires and other thick sections which require a long slow cure, XX Green can be used to a decided advantage. It is also suggested for use in heavy duty pneumatic treads because of the improved heat conductivity of high zinc oxide treads without sacrifice of abrasive resistance. Heavy duty inner tubes are another line in which protection against heat is essential and can be obtained in good degree by the use of XX Green Zinc Oxide.

New Machines and Appliances



Bridge's Cable Armoring Machine

Steel Tape Cable Armoring Machine

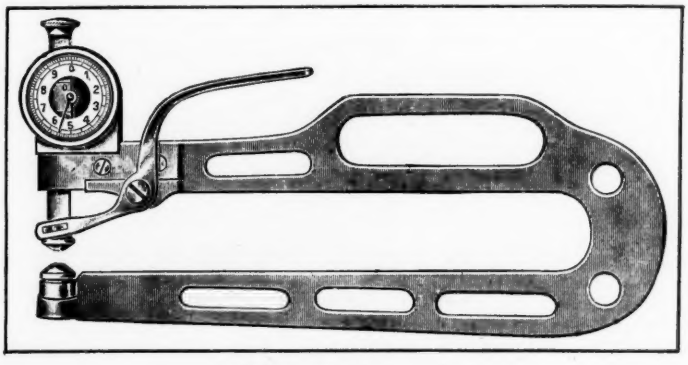
THE cable armoring machine shown in the illustration is of record size and has been designed to deal with cables up to 5½ inches diameter. It is provided with 10 steam jacketed compound tanks, 5 Hessian taping heads, 5 combined jute serving and taping heads, 1 steel taping head for applying steel tapes, and one whitewash tank.

The hauling-off wheel is 12 feet in diameter and the take-up stand will accommodate drums up to 12 feet in diameter carrying 20 tons of finished cable. The steel taping head is arranged to run at 175 and 200 r.p.m. and the Hessian tape and jute heads at 120 r.p.m.

The main drive is by electric motor and machine cut gears through a patent Heywood & Bridge's friction clutch. A separate motor drive is arranged for the compound tanks to enable the compound to be constantly agitated.—David Bridge & Co., Ltd., Castleton, Manchester, England.

A Hand Vacuum Cleaner

AN electric vacuum cleaner weighing only 3¾ pounds that does most of the work of attachments of large cleaners with a minimum of effort has been developed. Although small and compact, it possesses unusually strong suction. It is made of polished aluminum, has a molded compound handle, and is operated by a trigger switch conveniently located at the side of the motor. On the rear of the nozzle is a single brush, permanently attached. The twenty feet of flexible cord are provided with a molded rubber attachment plug on the end. By removing the bag and reversing the cleaner, it may be used for blowing the dust out of radiators and similar inaccessible places—General Electric Co., Schenectady, N. Y.



Zivy Sheet Micrometer

Automatic Cutting Machine

THE illustration represents a light power cutting machine of French design and manufacture. The shearing blade receives its motion from two eccentrics connected with the driving shaft. The automatic feed is adjustable and regulated by the mechanism shown at the left of the tool.

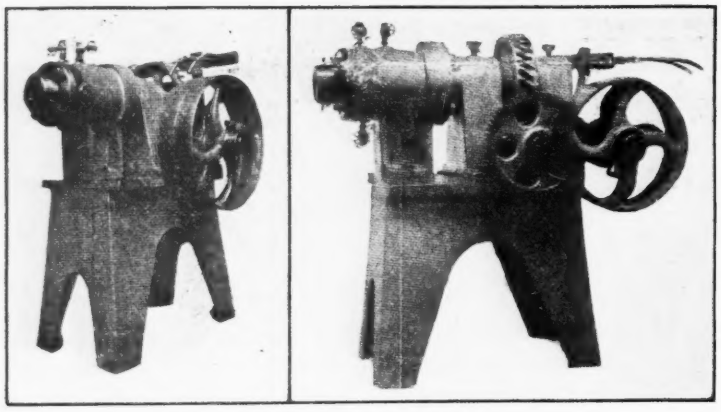
The machine is capable of large output of very uniformly cut product, and may be used for light sheet rubber, rubberized fabric, rubber erasers, and similar rectangular stock either in raw or vulcanized state.—Louis Yvroud, 21 Rue Christophe-Colomb, Ivry-sur-Seine, France.

French Automatic Cutter

Portable Sheet Micrometer

A DIAL reading portable micrometer of French design and manufacture is shown in the accompanying illustration. It is constructed to measure hard or soft sheet materials from 4 to 23½ inches (100 to 600 mm.) in from the edges. In this respect the intervals spanned by the various sizes are 100, 150, 200, 300, 450 and 600 mm. respectively.

The thicknesses are read from the dial which shows in mm. the thickness of stock between the measuring platens or faces. These faces are opened by pressure on a lever and close upon the sheet material by the action of a spring so that it always measures under the same conditions of pressure independently of the will of the operator. The measuring faces are of polished steel permitting the instrument to be freely moved over the surface of the stock as its variations in thickness are indicated on the dial of the instrument.



Small Type Yvroud Tubers

The two smaller models of this micrometer have frames of iron and the others of aluminum. For the measurement of yielding materials such as soft rubber the instrument is furnished with measuring platens of 3 cm. diameter.—Zivy & Co., 29 Rue de Naples, Paris, France.

French Tubing Machines

THE two tubing machines here pictured are of current French design and manufacture. In either one the screw may be taper or cylindrical and presumably of variable pitch. They are square ended, of hardened steel and have bronze bearings. Type 2 is furnished with speed reduction. Both types are shown for belt drive although they can be furnished motor driven. Both are light weight machines, No. 1, 660 pounds and No. 2, 814 pounds. Their stock capacity is small; therefore they are adapted only for light tubing, and small forms generally.—Louis Yvroud, 21 Rue Christophe-Colomb, Ivry-sur-Seine, France.

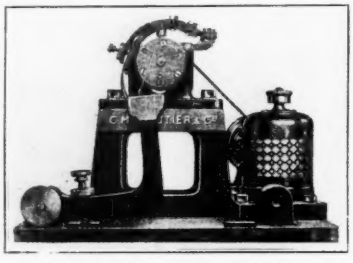
German Hydraulic Belt Vulcanizing Press

THE powerfully constructed belt press here pictured has certain distinctive features of design and construction that are of special interest to American manufacturers of rubber belting.

A patented clamp installation prevents pressure on the belt, a larger cooling installation insures against over-vulcanization, an automatic steering apparatus prevents air pockets, a specially high polished surface of the hot steel plate leaves the belt's surface faultless and the guides are made so that the belt edges have no flaws.

The side post nuts are made in "slit-form" and are so enclosed that loosening after the press is erected is not possible. Pistons are made from a special mixture and are highly polished. The packing rings can easily be changed while the exact finish of the pistons and cylinders prevents packing wear. There are records of rings which were used five years before replacement.

The press bed is heavy, preventing bending, and there is no pressure above the pistons. The steam channels are bored in the exact center of the hot plates, producing equal temperature over the whole surface. The plugs of the channels are easily removable for cleaning them. Two telescope pipes let the steam and cooling water in and out and necessitate only two sets of packing.



Gautier Hammering Machine

The stretching and clamping installation are on both ends and connected with the press bed. The vertical clamping cylinders have brass bearings reducing wear of the packing to a minimum. The installation works in a downward direction, allowing the belt to rest on the bottom plate during stretching and clamping. The cylinders are placed below to prevent leakage of water on the belt. A patented automatic apparatus obviates the need of balancing by counter weights. All parts of this "steering" valve can be changed and are made of the best phosphor bronze. The spindles are made from rustless steel.

Four small cylinders below the press bed work in double action and prevent sticking of the belt after vulcanization. The bed lowers without loss of time and the press opens quickly, rising faster without the use of water pressure. These cylinders are fed by high pressure, and close the press in about one minute. Cooling is effected by circulating water on both sides of the hot plate preventing over-vulcanization of the belt.

The press is provided with heat measuring apparatus, or so-called electric pyrometer, permitting measurement of the temperature over the entire surface of the hot plate. Extra equipment comprises recording steam and hydraulic manometers, also a steam economizing valve. The whole press is made from the best machined Siemens Martin steel. The inside of the steam plate bored channels is cleaned absolutely by high air pressure.—G. Siempelkamp & Co., Krefeld, Germany.

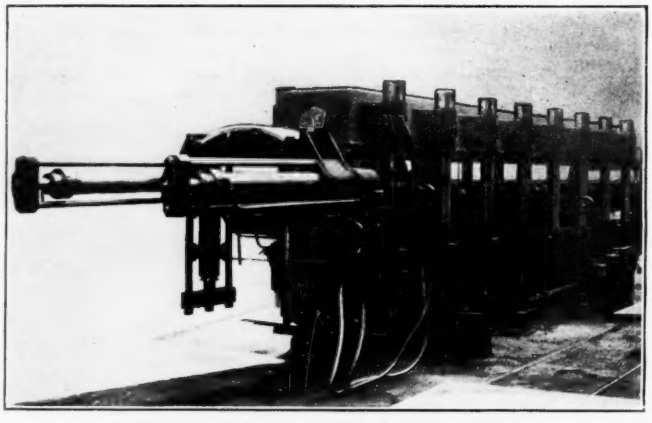
Rubber Joint Hammer

THE machine here pictured is specially adapted for joining in a tight seam clean cut edges of sheet gum. It is used mostly for making rubber gloves, tubes, toys, balloons, bladders, and any other articles made of die-cut pure sheet rubber.

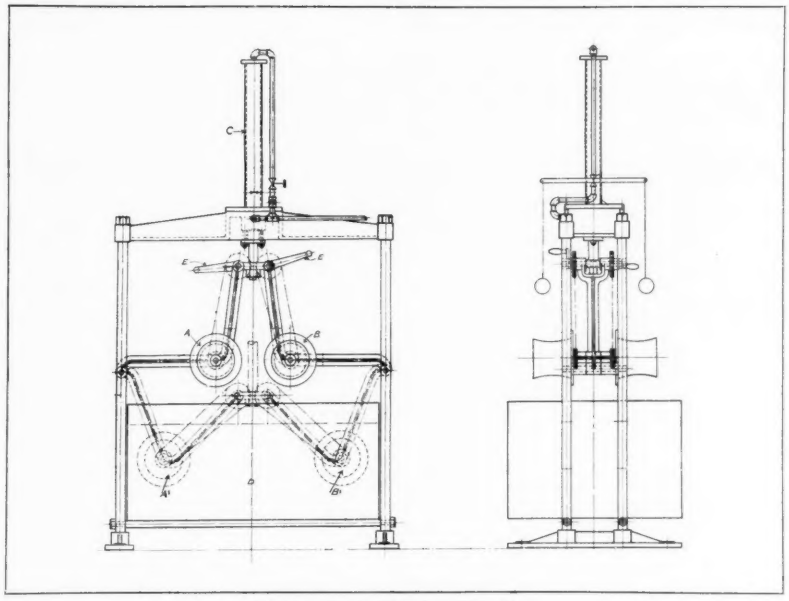
The work of seaming such goods was formerly done by lightly tapping the adjoining edges causing the clean cut edges to unite. The same result is accomplished with far greater speed and accuracy by the device illustrated.

The machine comprises a revolving head, turning at a speed of 1,500 r.p.m. The head carries 6 hammers and at the speed named they deliver 9,000 blows per minute on the joint being made. Such speed cannot be obtained with the customary machine using reciprocal hammers.

Various anvil forms are possible with the machine. One of those commonly supplied is a long tapered finger-like shape; another is flat and straight. Thus, the shape of anvil may be selected that is best



Siempelkamp Belt Press—Stretcher End



Utility Tube Testing Machine

suited to the work, and any desired change of anvil can be made quickly.

The intensity of the hammer effect can be regulated easily and precisely, so that on the same machine one can joint up sheets 0.1 mm. to 2mm. thick. The machine is motor driven from a light socket. —C. M. Gautier & Cie., 252 Rue du Landy, Saint-Denis (Seine).

Internal Timer for Vulcanizers

IN laboratories, press rooms, and vulcanizing plants the processes and cures are done in timed intervals. Common alarm clocks are frequently employed to mark these intervals but not being designed for accurate setting they are only approximately satisfactory.

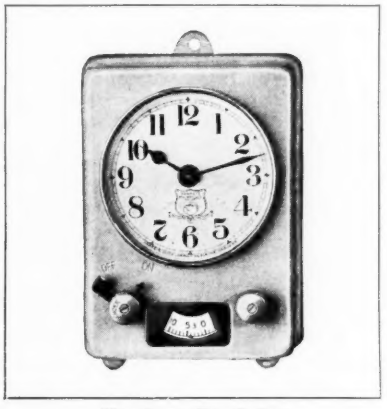
The illustration pictures the newest model of an alarm clock designed for quick and accurate setting from its front side to signal at any interval from 1 to 90 minutes in length. The interval is set by adjustment of the segment of the graduated disk appearing in the panel under the time dial. The exact moment at which the desired interval is to cease is set against a fixed index on the edge of the panel. The knob at the right is simply an on-and-off switch for operation of the interval indication.

When set, the reminder dial moves until its zero mark reaches the index. There it stops and the alarm rings reminding the operator that the process is finished.

This reminder is in effect a durable scientific instrument of great practical utility—Hawkeye Clock Co., Muscatine, Ia.

Factory Fences

ONE of the most important adjuncts to a factory is the fence that surrounds and protects the property. It must be strong, supported on posts that will not settle, sag, or break, and surmounted by a guard wire that will make it impossible for mobs or robbers to climb over.



Hawkeye Reminder

Steel posts set in concrete are often used, and also a system of anchoring the posts by means of steel stakes of angle section driven into the ground through saddles clamped to the post. This construction, supporting a heavy galvanized steel link woven wire fence, makes an ideal protection for factories and is very widely used.—Anchor Post Fence Co., 9 East 38th St., New York, N. Y.

Inner-Tube Tester

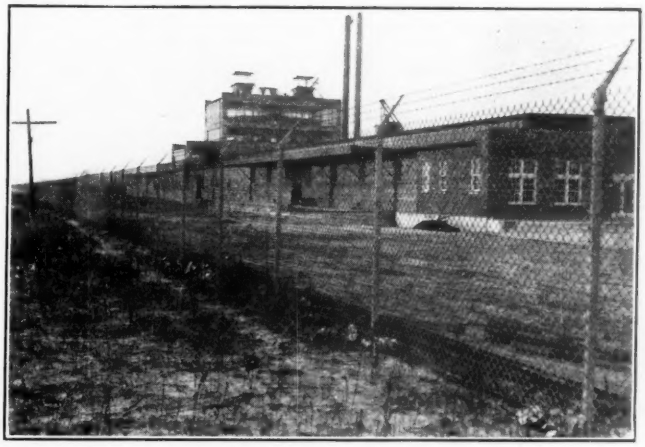
THE important functions of testing inner tubes for strength and freedom from leakage are performed by use of the mechanical device here represented in front and side elevations. The machine serves to stretch and water dip a pair of inner tubes at the same time.

A tube is inflated and placed around the aluminum spools A and B on one side of the machine when they are in their uppermost position, and a second tube on corresponding spools on the opposite side of the machine in their uppermost position.

When air is applied to the cylinder, the spools, being attached to a double linkage, move downward and out to predetermined positions as at A^1 and B^1. The tubes are thus stretched a definite amount. At the same time the tubes are submerged in water contained in the testing tank D and may be inspected for air leakage. The pair of spools can be revolved by operating a chain and sprocket drive by hand cranks E; thus while inflated and submerged the tube can be revolved three quarters of a revolution. Thus, should a leak be stopped by contact of the tube against the spool, it will be exposed and detected.

In case it is desired to subject the tubes to a break-down test under tension, a motor drive is applied to this testing device so that the tube may be driven several times its length while under water.—Utility Mfg. Co., Cudahy, Wis.

FOR SETTING UP AND REMOVING NUTS ON bolt-type vulcanizers, special rubber molds, and bolted machines of all sorts a reversible ratchet wrench handle is a most convenient tool. It expedites the work of bolting-up and makes possible the general adoption of interchangeable sockets. Ratchet handles are built of heavy sheet steel to meet all conditions of work.—Apco Mossberg Corp., Attleboro, Mass.



Anchor Post Fence

Editor's Book Table

Book Reviews

"The Melliand." The world's leading textile journal, scientific-technical adviser to the spinning, weaving, knitting, hosiery, bleaching, dyeing, printing, finishing, textile machinery, and rayon industries. Edited by Marcel Melliand. Published by The Melliand, Inc., Woolworth Building, New York, N. Y. Vol. 1, No. 1, April, 1929. Cloth, 178 pp. 7½ by 10½ inches. Indexed. Illustrated with cuts, charts, and textile samples.

This publication is issued monthly as a magazine or serial. The American edition was published to meet the request from prominent concerns in the United States. For a number of years, four separate editions have been published in French, Spanish, German, and for the British Empire. It is exclusively technical in its text. In addition to articles by American technicians, the latest textile improvements throughout the world will be reported.

The contents are classified as mechanical-technical, chemical-technical, international survey of periodicals, patent reports and patent law information. The scope of this publication is so broad that it cannot fail to contain valuable information for the rubber goods industry in which textiles of varied construction are essential as constituent materials.

"The Bridge of Life." By C. Harold Smith, author of "Rahwedia." Illustrated jacket. Blue cloth. 5¾ by 8¼ inches. Illustrated with half-tones and black and white drawings. 272 pages. Published by D. Appleton & Co., New York and London.

Although Mr. Smith is president of Binney & Smith Co., manufacturers, exporters, and importers of blacks, colors, clays, chemicals, and talc, 41 E. 42nd St., N. Y., his avocation is writing books. He calls "The Bridge of Life" his autobiography, but the book is more in the nature of random reminiscences. His childhood escapades will cause many a chuckle, and his description of New York fifty years ago is especially interesting. The adventures of the young English lad who circled the globe before he was seventeen and met with many mishaps and struggles before he finally achieved success are written in an entertaining fashion, providing a pleasant means of wiling away a few hours.

"The Preparation of Plantation Rubber." By Sidney Morgan, A. R. C. S., visiting agent and technical adviser for Estates in the East, formerly chief scientific officer of the Rubber Growers' Association. Preface and a chapter on vulcanization by Henry P. Stevens, M. A. (Oxon), Ph.D., F. I. C., consulting chemist to the Rubber Growers' Association in London. Second Edition. Constable & Co., Ltd., 10-12 Orange St., London, W. C. 2, England. Red cloth, 357 pages. Illustrated and indexed. 6 by 9 inches.

This book may well be called the Bible of the rubber planting industry, and in its new revised edition it is indispensable, more so than ever before, to those interested in rubber. The book is divided into six parts, covering adequately the topics of field operations, factory operations, machinery and buildings, the finished rubber, general items, and vulcanization. It is well indexed and profusely illustrated.

Some idea of the value and scope of the book may be realized from the following excerpt from the preface to the first edition:

"An earlier book, published in 1913, by the Rubber Growers' Association, entitled 'The Preparation of Plantation Rubber,' was well received and widely read. The book dealt in a very practical manner with problems with which the industry had to contend. A second edition was subsequently published. Both editions are now out of print. The present opportunity was therefore taken to revise the original work, with the result that it has been enlarged and practically rewritten. The information given is brought up to date, and covers the whole process of production commencing with the planting of the tree, passing on to the collection, coagulation, and curing of the rubber, and concluding with the packing for export. In the course of his work for the Association, Mr. Morgan carried out a great deal of industrial research in rubber production, including lengthy experiments on tapping, the use of different coagulants and different conditions of coagulation, and also on varying modes of rolling, drying, and smoking rubber. He also went very fully into the types of construction and details of the machinery and buildings employed on the estates."

New Publications

"Bristol's Automatic Electric Control Valves. Motor Operated and Magnet Types." This catalog of The Bristol Co., Waterbury, Conn., illustrates and describes principally a complete line of automatic valves for temperature control. These have been developed to a high state of perfection, and are offered for all ranges of temperature up to 3000° F., also for practically all ranges of pressure and liquid level.

"Firestone Gum-dipped Airplane Tires" is an attractive booklet issued by the Firestone Tire & Rubber Co., Akron, O., which contains complete technical data for airplane manufacturers. It is illustrated and has also tables and diagrams. Paper, 8½ by 11 inches. 16 pages.

"Vulcanization Accelerators, Bulletin No. 8, Vulcanol." This 16-page pocket-size pamphlet punched for loose-leaf notebook binding is issued by E. I. du Point de Nemours & Co., Inc., Dyestuffs Dept., Sales Division, Wilmington, Del. It summarizes the accumulated information concerning the properties of this unique accelerator gathered from practical experience during the two and one half years since Vulcanol has been commercially available to the rubber industry.

"The TAG Rubber Catalog." This catalog No. 901A of the C. J. Tagliabue Mfg. Co., 18 to 88 Thirty-third Street, Brooklyn, N. Y., comprises within its 64 pages profusely illustrated descriptions of the various Tagliabue instruments and their installation for the control of rubber manufacturing processes. Separate sections are devoted to Air Operated Controllers; Steam Operated Controllers; Recorders; Industrial Thermometers; and miscellaneous accessory equipment of special adaptation.

"The Company and the Man." This booklet of 62 pages, issued by The Goodyear Tire & Rubber Co., Inc., Akron, O., tells the story of the Goodyear company in ten short chapters under the following headings: Goodyear Industrial University; the Flying Squadron; Labor Division; Goodyear Industrial Assembly; Employes Organizations; Physical Education and Recreation; How Goodyear Products Are Made; The Production Process; Goodyear Products; and Aeronautics. The volume is profusely illustrated, and its frontispiece is an excellent portrait of Paul W. Litchfield, president of the company.

"XX Green Zinc Oxide, a Pigment for the Rubber Industry." This technical service bulletin of pocket note book size is issued by the New Jersey Zinc Sales Co., 160 Front St., New York, N. Y. The booklet contains a number of photomicrographs and charts illustrating the properties of the material and their effects in rubber compounding.

"Fine Rubber Bathing Caps for the 1929 Season" is the title of a most attractive catalog issued by the Seamless Rubber Co., New Haven, Conn. It contains colored illustrations of the latest in marine millinery, ranging from the popular aviator caps to "The Vagabond," a four-piece sport hat. Paper, 8½ by 11 inches.

Clifton Mfg. Co., Boston, Mass., has released a small catalog, No. 229, which contains descriptions and illustrations of its Crown Brand raincoats, hats, aprons, ponchos, and blankets for street wear, auto, sports, or camping. The company also manufactures for men, women, boys, misses, and children, leatherette finish coats under the names "Kidtex," "Swedtex," and "Caltex," also double texture trench and plain models. Paper, 3½ by 7¾ inches.

"Rubber Research Scheme (Ceylon)," Fourth Quarterly Circular for 1928, reprinted from the *Tropical Agriculturist*, December, 1928, contains four articles of interest to the rubber industry—on scraped bark surfaces, high-yielding plants at Heneratgoda, budgrafting and the relationship between stock and scion in budded plants. Paper, 7⅜ by 9⅝ inches, illustrated.

"Alphabetical Index and Numerical List of United States Government Master Specifications, Promulgated by the Federal Specifications Board" (complete to June 30, 1928), Circular No. 371, issued by the Department of Commerce, Bureau of Standards, contains several specifications pertaining to the rubber industry. Paper, 5¾ by 9⅛ inches.

"Salvage and Reclamation Bulletin Including Clearing House Offerings." This is the official organ of the Salvage Division of the National Association of Waste Material Dealers, Inc. The issue dated April 15, 1929, is devoted to the Salvage Division Meeting and Conference held at the Western Electric Co.'s plant, Chicago, Ill., March 21, 1929. The papers read at the conference by representatives of the salvaging operations of various industries included two concerning salvage in the rubber industry. Both of these were by H. R. Thompson, Morgan & Wright Co., (U. S. Rubber Co.), Chicago.

"Tires, Bicycle, Single Tube and Clincher." U. S. Government Master Specification No. 581. Paper pamphlet of four pages. Published by Bureau of Standards, Washington, D. C. This was promulgated by the Federal Specifications Board on Oct. 1, 1928 for government department use in the purchase of single tube and bicycle tires. The technical requirements of this specification are mandatory for all government departments not later than Jan 2, 1929.

"British Colonial Office Reports on the Rubber Situation." Trade Information Bulletin No. 603 issued by the Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C. Paper, 35 pages. 5⅞ by 9⅛ inches. This bulletin contains much valuable information including many statistics of interest to the rubber industry.

Rubber Bibliography

CONTRIBUTION TO THE THERMOCHEMISTRY OF RUBBER.—Siegfried Boström. Translated from *Kolloidchem. Beihefte*, Vol. 26, No. 10-12, June 30, 1928, by J. P. Fahy. *Rubber Chem. Tech.*, Apr., 1929, pp. 259-74. Illustrated.

A THERMODYNAMIC THEORY OF RUBBER FILLERS.—Translated from *Zeit. Electrochemie, etc.* Vol. 34, No. 9, pp. 662-4, Sept., 1928. *Rubber Chem. Tech.*, Apr., 1929, pp. 275-7.

HOW THE RUBBER INDUSTRY MAINTAINS UNIFORMITY OF PRODUCT.—R. W. Moorhouse, *Chem. Met. Eng.*, Apr., 1929, pp. 208-10.

TEMPERATURE RECORDING MICROPRESS FOR STUDYING THE COURSE OF VULCANIZATION.—Jas. C. Walton. *Ind. Eng. Chem.*, Analytical Ed., Apr. 15, 1929, pp. 106-8.

EFFECT OF ANTIOXIDANTS IN TYPICAL RUBBER STOCKS.—Marion C. Reed, *Ind. Eng. Chem.*, Apr., 1929, pp. 316-18.

CHART FOR THE ESTIMATION OF EQUIVALENT CURES.—C. L. Brittain, *Ind. Eng. Chem.*, Apr., 1929, pp. 362-64.

RUBBER SOLVENTS, VARNISHES, AND COATINGS.—R. Assman, *Farbe. Lack*, pp. 396, 411, 426-7, (1928).

RUBBER STATISTICAL POSITION.—E. V. Harbourne. *Russell's Review Commodities and Finance*, Mid-April, 1929. Vol. III, No. 4, pp. 14-15 and 23-24.

DETERMINATION OF THE IODINE NUMBER OF RAW RUBBER.—Adolf Gorgas. Translated from *Kautschuk*. Vol. 4, No. 11, Nov., 1928, pp. 253-4. *Rubber Age* (N. Y.), Mar. 10, 1929, pp. 617.

RUBBER.—Kurt H. Meyer and H. Mark, *Ber.*, 61 B, pp. 1939-49 (1928).

AGING OF RUBBER.—Alfons Zelnicee, *Chem. Obzor.* 3, pp. 233-43, 257-63 (1928).

AGING OF RUBBER UNDER TENSION.—Gabriel G. Balazs, *India Rubber & Tire Rev.*, No. 10, p. 20, 1928; *Gummi-Ztg.*, 43, pp. 708, 710.

ALDEHYDE DERIVATIVES OF SCHIFF'S BASES AS VULCANIZATION ACCELERATORS: A-11, A-16, A-19, A-20, AND A-50, AND THE ULTRA-ACCELERATOR L-88.—Rudolf Ditmar and Manfred Rachner, *Chem.-Zeit.*, 52, p. 935 (1928).

A FURTHER STUDY OF THE VULCANIZATION OF OILS.—H. P. Stamberger. *Rec. trav. chim*, 47, pp. 973-6 (1928).

DETERMINATION OF THE RUBBER CONTENT IN LATEX PRESERVED WITH TRISODIUM PHOSPHATE AND FORMALIN.—W. Spoon and N. Baumé-Nieuwland., *Arch. Rubbercultuur*, 12, pp. 659-71 (1928). Summarized in English, pp. 672-4.

COAGULATION PHENOMENA IN HEVEA LATEX. VIII. RUBBER OBTAINED BY FREEZING LATEX.—O. de Vries and N. Baumé-Nieuwland *Arch. Rubbercultuur*, 12, pp. 675-82 (1928). Summarized in English, pp. 683-5.

THE STICKINESS OF UNVULCANIZED RUBBER.—R. W. Griffiths and Maldwin Jones. *Trans. Inst. Rubber Industry*, 4, pp. 235-46 (1928).

COMPLETE RECOVERY OF SCRAP RUBBER.—E. Rouxeville, *Rev. gén. caoutchouc*, 6, No. 48, pp. 15-6 (1929).

BAND TIRES.—T. S. Gardner, *Trans. Inst. Rubber Industry*, 4, pp. 247-62 (1928).

SIMPLE TREAD-CRACKING TEST.—A. H. Nellen, *Rubber Age* (N. Y.), 24, pp. 373-4 (1928).

FREEZING OF RAW RUBBER.—I, A. van Rossem and J. Lotichius; II, J. R. Katz, *Kaut.*, 1929, 5, pp. 2-5, 6-9.

OXIDATION OF VULCANIZED RUBBER.—A. van Rossem and P. Deker, *Kaut.*, 1929, 5, pp. 13-21.

TOPOCHEMICAL REACTIONS WITH RACKED RUBBER.—F. Kirchhof, *Kaut.*, 1929, 5, pp. 9-13.

COLORING OF RUBBER.—W. J. S. Naunton, *J. Soc. Dyers & Col.*, 1929, 45, pp. 31-35.

COLD VULCANIZATION OF RUBBER (PARKE'S PROCESS).—P. Bourgois, *Bull. Féd. Ind. Chim Belg.* 1929, 8, pp. 3-8.

VULCANIZATION AND STRUCTURE OF RUBBER.—E. Lindmayer, *Kaut.*, 1929, 5, pp. 35-8.

THE ACCELERATOR "TUADS" AND ITS SUBSTITUTES.—F. Löblein, *Kaut.*, 1929, 5, pp. 38-43.

THE MANUFACTURE OF FABRICS FOR COLLAPSIBLE BOATS.—Walter M. Munzinger, *Gummi-Ztg.*, 1929. Vol. 43, No. 23, pp. 1292-93.

THE RECOVERY OF SOLVENT FROM SPREADING MACHINES.—Ing. Otto Krebs, *Gummi-Ztg.*, 1929. Vol. 43, No. 23, pp. 1294-95.

ADSORPTION AND DIFFUSION OF GASES THROUGH BALLOON FABRICS.—Andre Dubosc, *Rev. gén. caoutchouc*, 1929. Vol. 6, No. 49, p. 14.

USE OF RUBBER IN THE CHEMICAL INDUSTRY.—J. Panem, *Rev. gén. caoutchouc*, 1929. Vol. 6, No. 49, pp. 15-17. Illustrated.

RECOVERY OF SOLVENTS BY THE BOECLER SYSTEM.—A. Boecler, *Rev. gén. caoutchouc*, 1929. Vol. 6, No. 49, pp. 18-20.

THE AGING OF RUBBER. ITS PRESERVATION.—F. Jacobs, *Le Caoutch.*, 1929. Vol. 26, No. 301, pp. 14,382-14,383.

THE USE OF CATALPO IN THE RUBBER INDUSTRY.—A. D. Luttringer. *Le Caoutch.*, 1929. Vol. 26, No. 301, pp. 14,389-14,390.

DYNAMOMETER, PIERRE BREUIL SYSTEM.—Description of Apparatus and Tests. Diagrams. Illustrations. *Le Caoutch.*, 1929. Vol. 26, No. 301, pp. 14,405-14,434. In English and French.

THE ELASTO-DUROMETER, PIERRE BREUIL SYSTEM.—*Le Caoutch.*, 1929. Vol. 26, No. 301, pp. 14,435-14,442. Illustrated. Tables.

NEW VISCOSIMETER, MICHELL SYSTEM.—*Le Caoutch.*, 1929. Vol. 26, No. 201, pp. 14,447-14,453. Illustrated.

PLASTIFICATION AND PLASTIFIERS.—Paul Bary, *Le Caoutch.*, 1929. Vol. 26, No. 301, pp. 14,464-14,468.

COMBATING MITES IN HEVEA NURSERIES.—Ir. H. Gongryp, *Archief.*, 1929. Vol. 13, No. 2, pp. 79-89. Illustrated. English version, pp. 90-97.

INVESTIGATIONS CONCERNING RED ROOT MOLD OF HEVEA.—Dr. W. Bobilioff, *Archief.*, 1929. Vol. 13, No. 2, pp. 96-115. Illustrated. English summary, pp. 116-117.

ONAZOTE. J. C. G. Kunhardt, *Bull. Rubber Growers Asso.*, Mar., 1929, pp. 222-8. Illustrated.

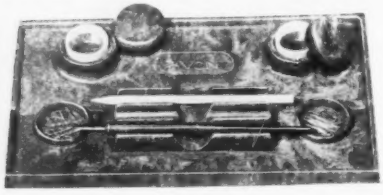
THE MECHANISM OF THE REENFORCEMENT OF RUBBER PIGMENTS.—H. A. Depew, *India Rubber J.*, Apr. 13, 1929, pp. 553-7.

ALTERING TIRE TREADS ON ROAD SURFACES.—Colin Macbeth, *Rubber and Tyre Rev.*, Apr., 1929, p. 252.

New Goods and Specialties

A Rubber Desk Set
Novelty from England

DESK sets are always popular, but when they combine beauty with usefulness they become indispensable. Such a feature is the Avon Desk Companion Set, the latest in rubber novelties. It consists of two units—a framework to hold



Avon Desk Companion Set

blotting paper measuring 18⅜ by 12⅛ inches and a smaller piece measuring 12 by 7 inches which contains inkwells, pen rest, and two receptacles for sundries. The set is molded in rubber and can be supplied either in plain black or in a "marbled" (two-color) design.

The special advantages of the Avon Desk Companion Set which differentiate it from similar articles of wood or metal are: it is washable, and, therefore, need never become stained or soiled; it will last indefinitely, becoming as new after each washing; and it cannot break and will not scratch or slip on a polished surface.—The Avon India Rubber Co., Ltd., 343-5 Euston Rd., London, N.W.1., England.

New Red Stripe on
Goodyear Heavy Duty

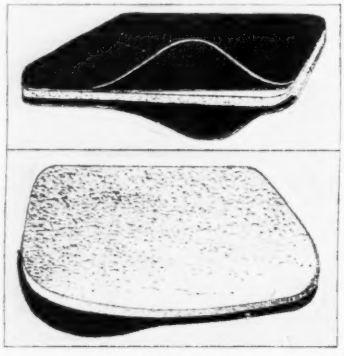
THE Goodyear Super Heavy Duty cushion tire will sport soon a striking new red stripe. This will appear around the tire at about the level of the top of the tread of standard height solids and between two ribs to protect it even in service and to prevent its being rubbed off. The new stripe will match up exactly with the seal on Super Heavy Duties, the red ring with a black center. This red seal is the mark of Goodyear's multiple stock construction which gives to the Super Heavy Duties the combination of long mileage possibilities and resistance to internal heating.—The Goodyear Tire & Rubber Co., Akron, O.

Goodyear Truck Tire

Three New Developments
in Office Equipment

FROM England come these three items designed for greater efficiency and comfort—the "Felmatic" typewriter mat, the "Seat-o-matic" chair pad, and the "Jocamatic" blotting pad.

The first is composed of two sheets of rubber with a core of specially resilient felt. The mat absorbs shocks, deadening the sound, and by eliminating the vibration, it assists in maintaining the alinement of the type and prolongs the life of the machine. The corrugated rubber undersurface of the mat holds the typewriter as securely as though it was screwed down, and the machine cannot slip or move even though the desk is tilted at an angle. The "Felmatic" mat is also more sanitary, because it cannot absorb dust and may be sponged on both sides.



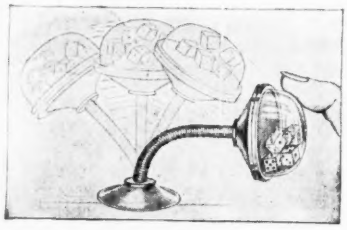
(Top) "Felmatic"
(Bottom) "Seat-o-matic"

The "Seat-o-matic" chair pad, made of a special wool surface which prevents clothes from getting shiny and a rubber surface which prevents the pad from slipping, will eliminate the inconveniences and annoyances caused by the old-style pad. The rubber surface enables it to remain in position under all circumstances without fixing, even though the chair is tilted at an acute angle. The "Seat-o-matic" pad comes in 3 sizes: 13½ inches circular, 14½ by 15½ inches shaped, and 17½ by 18 inches shaped.

The manufacturer states that the "Jocamatic" blotting pad is superior to any other because it never will look shabby and always will remain where it is placed for it cannot slip about or move unless lifted from the desk. It can be washed as occasion may dictate. There are two models: terra cotta color rubber and a green color with molded corners. Both are made with the same size blotting areas: 17½ by 11 inches or 17½ by 22 inches.—C. W. Cave & Co., Ltd., 45 Farringdon Rd., London, E. C. 1, England.

A Fair Shake for All

THOSE people who, when playing a game with dice, find themselves handicapped by their inability to shake well the dice will welcome this novel device. By it a fair shake is assured everyone. This peppy little "Fair Shake" is finished in a variety of bright colors. The transparent



"Fair Shake"

celluloid dice cup is practically unbreakable, and the rubber suction-cup base can be attached to any smooth surface. A push of the finger will bend the flexible rod and start the dice shaking.—The Marbelite Co., Wallingford, Conn.

Rubber Beauty Culture Apron

FOR the past several years there has been an increasing demand for a beauty culture apron that could be instantly adjusted in one operation to fit any customer.

Apron with Talon Fastener

This has now been made possible by an apron equipped with a Hookless Talon Fastener. The illustration shows the method of putting on the Talon Fastener, and with just a mere "zip" the one and only adjustment is made. This apron is made of many different materials such as fancy rubber coated percales, cretonnes,

and the more staple numbers of grey and olive rubber coated bombazine.—Neversoil Rubber Products Co., 621 E. Ninth St., Los Angeles, Calif.

For Fashion's Followers

FASHION is a most fickle creature. Gone now are the straight boyish lines sternly demanded a short time ago. Instead Fashion decrees the new soft-silhouette of femininity. Peggy Ann was designed with this in view. This dainty garment, here illustrated, is made in several materials, all with the soft yielding rubber inserts that mold and slenderize the

Peggy Ann

figure to the newly-approved silhouette. This combination brassiere-girdle is light and pliant—exquisite, yet practical for every-day wear. It forms the perfect foundation for the new dressmaker modes and is ideal for every occasion.

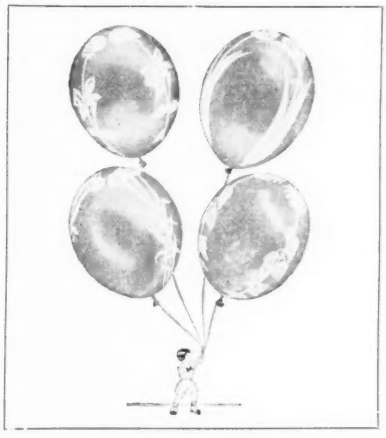
Even with constant laundering, Peggy Ann, according to her creator, retains her original loveliness.—Biltwell Brassiere Co., 44-50 E. 32nd St., New York, N. Y.

Murray DeLuxe Tire

THE Murray DeLuxe Tire is made of long, staple, Egyptian cotton, coated with extra heavy friction and skim rubber. The last two plies are of the squeegee type with very thick cushions and the tread is the finest that can be produced. The tread stock has a tensile strength of about 4,000 pounds per square inch. The bead reenforcement has a great factor of safety, running up as high as three separate and distinct wire beads in the truck and bus tires. This reenforcement from the beads up through the sidewall is about double the amount usually put in high grade tires. Each strip of reenforcement fabric runs farther up the sidewall than the one before; so the flexing is evenly distributed, and sidewall and bead breaks are thereby eliminated.—Murray Rubber Co., Trenton, N. J.

Flowers in the Air

THE kiddies just delight in balloons, especially ones that are different. These floral designs surely will please them. The designs ornament the entire



Floral-Design Balloons

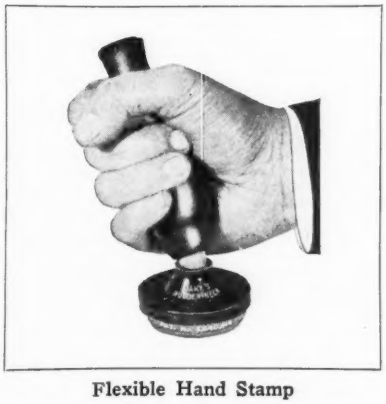
balloon and look realistic, each flower being printed in colors to harmonize with the color of the balloon.—The Barr Rubber Products Co., Sandusky, O.

Adhesive Bandages

THE Seamless Rubber Co., New Haven, Conn., offers an adhesive bandage which is ready for instant application. It is a combination of zinc oxide adhesive plaster and surgical gauze for bandaging quickly, easily, economically, and efficiently any cut, sore, wound, or abrasion.

New Stamp Mount

LAKE'S rubber-neck flexible stamp mounts are made to withstand rapid and hard usage. They are neat and durable, an ornament to any desk. Flexible handle stamps can be applied to any form of business where rapid stamping and good clear impressions are necessary. They are



Flexible Hand Stamp

designed also to reduce the jar and to allow the stamp to hit square on the printing surface no matter at what angle the impression is made.

The base and neck of this new flexible hand stamp are cast in one piece of high grade rubber. The shoulder at the base of the neck offers greater strength and more distribution over the face of the entire printing die. The neck is reenforced with a coil spring which adds strength but does not interfere with the flexibility of the stamp. These mounts are made in various sizes, furnished with or without dates.—Lake Mfg. Co., 1910 Caddo St., Dallas, Tex.

Popular Trench Coat

WHEN showers threaten and the rain comes down in torrents, a fashionable, yet serviceable, protection is this Trench Coat, modeled after the swagger officers' top coat. It may be had in many

Cambridge Raincoat

colors in twills, whipcords, jeans, tweeds, homespuns, and the bright leather-lik fabrics. The linings are of suede or plaid, single or double texture. Women's and misses' sizes range from age 14 to size 44, and men's from 34 to 46. A good demand for tweeds and homespuns is expected during the Spring and Fall.—Cambridge Rubber Sales Corp., Cambridge, Mass.

Textolite Weatherproof Sockets

SOCKETS, composed of molded textolite bodies to which are assembled a screw shell and center contact with leads attached, and made weatherproof by means of a special bushing, have been developed by the Merchandising Department of the General Electric Co., Bridgeport, Conn. These sockets are designed particularly for use in outdoor string lighting, signs, damp cellars, or any place subjected to dampness, weather, steam vapor or acid fumes. They are rated 660 watts, 600 volts.

Financial and Corporate News

The Garlock Packing Co.

The Garlock Packing Co., Palmyra, N. Y., is increasing its capital stock by the sale of 100,000 shares of common stock, without par value, and $3,000,000 ten-year 6 per cent convertible debentures. The company was organized in 1887 and is today the largest producer in the United States of mechanical packings used to prevent the leakage of steam, water, air and oil, and other liquids and gases in the operation of pumps, compressors, engines of the steam, gas and Diesel types, pipe lines, and nearly all types of power machinery.

United States Rubber Co.

To Stockholders and Employes:

Since my election as President of the United States Rubber Co., I have given much careful thought, in collaboration with members of the organization, to those problems of the company which appeared to require prompt attention, of which I conceive the problem of organization to be most urgent, lying as it does at the very foundation of all concerted action necessary to realize that large measure of success which I believe the company can and ought to achieve.

It is gratifying to find in the personnel of the company so much of capacity, intelligent ability, and loyalty to the principle of company success, that it has not been deemed necessary or desirable thus far to go outside of the company to fill any important position. We believe that with proper organization we have sufficient personnel within the company to create within the old company a new company, imbued with a new spirit, capable of bringing to successful fruition all those elements of fundamental advantage which the company possesses.

It is the purpose of this letter to announce to you the plan of organization which has been decided upon.

Broadly, the new plan of organization involves changing the system of centralized control which has existed heretofore into one in which the company's business is divided into separate departments or companies, each directed and operated by a General Manager—or a President in the case of a subsidiary operating under its own name—who will have control and absolute responsibility for all of the operations of his department. The departments are established along the lines of commodities or groups of commodities having common characteristics of manufacture or distribution, as follows:

TIRE
Pneumatic Tires & Tubes; Solids & Cushion; Bicycle & Motorcycle Tires & Tubes; Airplane Tires & Tubes; Tire Accessories.

FOOTWEAR
Waterproof; Keds; House Slippers; Felt Goods; Leather Shoes.

MECHANICAL GOODS
Belting; Hose & Packing; Molded & Miscellaneous Goods; Wire & Tape; Mats & Matting; Interlocking Tiling; Jar Rings.

SUNDRIES
Golf Balls; Thread; Card Cloth; Hard Rubber; Bathing Accessories; Druggists' Goods; Flooring; Soles & Heels.

CLOTHING
Waterproof Clothing; Naugahyde Specialties; Carriage & Auto Topping.

RUBBER REGENERATING CO.
Reclaimed Rubber.

NAUGATUCK CHEMICAL CO.
Heavy Acids; Lotol (Latex composition); Accelerators; Anti Oxidants; other Chemicals.

DOMINION RUBBER CO., LTD., CANADA
Waterproof Footwear; Tennis Footwear; Felt Footwear; Mechanical Goods; Sundries; Tires & Tubes.

GENERAL RUBBER CO.
Sprayed Rubber; Liquid Latex; Crepe, Smoked Sheet and other market grades.

UNITED STATES RUBBER PLANTATIONS, INC.
Ten Estates in British Malaya and Sumatra, D. E. I., comprising 135,100 acres owned, 88,500 acres planted, and 59,000 acres mature.

DISTRIBUTING DISTRICTS
Warehouses located in principal cities of the United States.

UNITED STATES RUBBER EXPORT CO., LTD.
Branches and distributers located in all countries throughout the world.

The General Manager of each department will control all of its activities, including manufacturing, selling, accounting, and research and development, and will report to the President. Each General Manager is entitled to use all the general service departments of the company, and in fact will be expected to avail himself of their help to the fullest extent. These general service departments are as follows:

FINANCE AND ACCOUNTS
PLANNING AND ENGINEERING DEVELOPMENT
INDUSTRIAL AND PUBLIC RELATIONS
COMMERCIAL RESEARCH
ADVERTISING
PURCHASING
TRAFFIC
LEGAL AND PATENT

This type of organization is designed to give each General Manager the greatest freedom of action, and all the help which can be usefully availed of from each and every department and individual in the company. Correspondingly, the General Manager will be held absolutely and solely responsible for the success of his department.

Representing the Board of Directors, and advising with the President in the general administration of all of the activities of the company, are two committees, namely, the Finance Committee and the Executive Committee.

The Finance Committee comprises the President and members of the Board of Directors who, on account of special knowledge and experience, are best qualified to act in matters of corporate finance.

The Executive Committee is made up of those members of the organization who have heretofore been charged with the responsibility of some of the major activities of the company as it has heretofore been organized. This committee will hold regular meetings each week. Its function is to advise with the President in all of the operations of the company related to manufacturing, selling, and development and research, and to represent the Board of Directors in the supervision of the operations of the various departments. Each member is entitled to and should have full knowledge of the affairs of all departments, will receive copies of all reports from all the General Managers of the various departments, and is expected to enter into discussion and act in an advisory capacity with respect to all of the activities of the company, whether or not such activities are those with which he has been directly connected in the past.

It is our purpose in the near future to have a plan providing for participation in the profits of the company by those who, by industry and intelligent effort, or conspicuous ability, make outstanding contribution to the company's success.

The company possesses many special advantages in the rubber world, such as: the enormous good will attaching to its trade marks, many of which date back to the very beginning of the rubber industry; its strong position in the field of production and purchase of crude rubber, with branch crude rubber houses in all the rubber markets of the world; its rubber plantations, which are many times larger than those of any other American manufacturer, and in fact larger than those of any other single concern in the world; its position of leadership in the scientific production of crude rubber, which is recognized throughout the entire rubber producing world; the splendid personnel and efficient organization of its Development Department, which has to its credit practically all of the notable features of advance which have been made for a number of years past; for example, the production of the new latex sprayed rubber, web fabric, a special tire building process now utilized in the building of the majority of tires made throughout the world, the establishment of a new line of possibilities in the arts by the use of rubber in latex form, and the development of a new line of chemicals to be used as accelerators and antioxidants. To these special advantages should be added important ideas now in process of development in the General Laboratories.

With an organization operating as outlined above, giving proper value to the advantages which the company possesses, and receiving the active, energetic support of stockholders and employes, the company must realize the greatest measure of successful achievement.

1790 Broadway, N. Y.
April 23, 1929

F. B. Davis, Jr.,
President.

U. S. Rubber Department Heads

The following general managers of departments were recently appointed:

Footwear Department: General Manager, T. J. Needham; Assistant General Manager, H. S. Marlor.

Mechanical Department: General Manager, Walter Gussenhoven; Assistant General Manager, W. C. Bowker.

Sundries Department: General Manager, H. W. Waite; Assistant General Manager, C. A. Blake.

Tire Department: General Manager, L. D. Tompkins.

Clothing Department: General Manager, Geo. E. Goodwin; Assistant General Manager, G. S. Woodward.

Rubber Regenerating Co.: President, E. A. Andersen.

Naugatuck Chemical Co.: General Manager, Elmer Roberts.

U. S. Rubber Export Co.: President, Herbert E. Smith; General Manager, Chas. E. Guest.

General Rubber Co.: President, L. D. Tompkins; Vice President, John Donaldson.

U. S. Rubber Plantations, Inc.: President, H. S. Hotchkiss; Vice President, Don E. Andrews; Managing Director, J. W. Bicknell.

General Service Departments

Planning and Engineering: Director, E. O. Upham; Assistant Director, H. F. Newell.

Development: Director, Ernest Hopkinson; Manager, W. A. Gibbons; Assistant Manager, N. A. Madge.

Industrial and Public Relations: Director, C. S. Ching.

Commercial Research: Director, Walter Emory.

Advertising: Director, W. F. Earls.

Purchasing: General Purchasing Agent, Wm. H. Marsh; Assistant General Purchasing Agent, Geo. M. Tisdale.

Traffic: General Traffic Manager, Geo. F. Hichborn.

Legal and Patent: General Attorney, P. H. Arthur; Patent Attorney, W. L. Pipes.

New Executive Officers of U. S. Rubber

Directors of the United States Rubber Co. held an important organization meeting on April 23, and the following changes were made in the management:

F. B. Davis, Jr., is president of the company. James S. Alexander, Henry Davis, and Sir William Wiseman, partner of Kuhn, Loeb & Co., now form the finance committee, which formerly was composed of J. S. Alexander, J. B. Ford, W. S. Ballou, N. F. Brady, and Charles B. Seger. Mr. Seger resigned as chairman of the board of directors several weeks ago.

Members of the executive committee now include F. B. Davis, Jr., chairman; Edward J. Coughlin, William O. Cutter, Ernest Hopkinson, Herbert E. Smith, and Lucius D. Tompkins.

The list of officers now includes F. B. Davis, Jr., chairman of the board and president; Edward J. Coughlin, William O. Cutter, Ernest Hopkinson, Herbert E. Smith, and Lucius D. Tompkins, vice presidents; Wilson H. Blackwell, treasurer; Eric Burkman, secretary; and Arthur Surkamp, comptroller.

Mr. Coughlin, Mr. Smith, and Mr. Tompkins were elected directors, along with Victor M. Cutter, William De Krafft, James Deshler, Percival Dixon, Henry F. Miller, and Lewis L. Strauss. Five of the new directors took the places of John W. Davis, Henry L. Hotchkiss, Samuel M. Nicholson, Homer Sawyer, and Charles B. Seger.

The B. F. Goodrich Co.

At the annual meeting of the stockholders of The B. F. Goodrich Co., held April 17, 1929, directors whose term of office expired were reelected. A vacancy in the Board of Directors was filled by the election of C. M. Keys. At the directors' meeting all the officers were reelected.

The stockholders voted to retire 11,880 shares of preferred stock in accordance with the charter provisions. An increase of common shares from 1,000,000 to 1,500,000 was authorized in accordance with the notice of the meeting. By-Law amendments were approved changing the date of the annual meeting to the first Wednesday in May.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

Number	Inquiry
1217	Name of manufacturer of corn starch for rubber makers' use.
1218	Information regarding fan belt specifications.
1219	Annual volume of sales of linemen's gloves in the United States.
1220	Manufacturer of sponge rubber for use in weather stripping.
1221	Rubber table cloths.
1222	Manufacturers of vacuum cups for attaching show cards to windows.
1223	Quantity, kind, and temperature of water best suited for a plant making 5,000 tires daily.
1224	Manufacturer of rubber rag rugs.
1225	Source of supply of "dead" Borneo.
1226	Makers of sponge rubber sheet for auto floor mats.
1227	Manufacturer of pneumatic rubber dress-form.

Foreign Trade Circulars

Special circulars containing foreign rubber trade information are now being published by the Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Number	Special Circulars
2261	Belgian Tire Exports, Calendar Year 1928.
2262	German Tire Exports, Calendar Year 1928.
2267	French Tire Exports, Month of January, 1929.
2268	French Footwear Exports, Month of January, 1929.
2276	Increasing Demand for Footwear in Lithuania.
2279	British Exports of Automobile Casings, January, 1929.
2280	Report of the Standing Committee Respecting Rubber Manufactures.
2282	British Exports of Footwear, January, 1929.
2283	British Exports of Belting, Calendar Year.
2284	Exports of Solid Tires, Calendar Year 1928.
2289	Rubber Division Special Circulars First Quarter 1929.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

Number	Commodity	City and Country	Purchase or Agency
37,196	Mechanical goods	Harbin, China	Both
37,240	Balls and balloons	Quebec, Canada	Purchase
37,241	Boots, shoes and galoshes	Berlin, Germany	Agency
37,242	Tires	Sliven, Bulgaria	Both
37,243	Overshoes and gaiters	Frankfort, Germany	Either
37,244	Footwear and toys	Milan, Italy	Purchase
37,245	Composition floor tiles	Glasgow, Scotland	Either
37,246	Tires	Budapest, Hungary	Agency
37,247	Tires	Budapest, Hungary	Agency
37,248	Sanitary goods, shoes, caps, belts, gloves, etc	Rome, Italy	Agency
37,255	Shoes	Vienna, Austria	Agency
37,272	Erasers and bands	Dusseldorf, Germany	Agency
37,295	Canvas shoes	San Juan, P. R.	Agency
37,301	Surgical and mechanical goods and druggists' sundries	Helsingfors, Finland	Agency
37,313	Dental and surgical goods	Johannesburg, S. A.	Agency
37,318	Canvas shoes	Vancouver, Canada	Agency
37,330	Heels and soles	Tallinn, Estonia	Both
37,331	Scrap tires (inner tubes)	Paris, France	Agency
37,332	Overshoes	Frankfort, Germany	Agency
37,367	Tubing	Warsaw, Poland	Both
37,470	Tires and tubes	Teneriffe, Canary Islands	Purchase
37,474	Surgical and dental goods	Johannesburg, S. A.	Both
37,544	Bathing caps and shoes	Copenhagen, Denmark	Agency
37,552	Tires	Dairen, Manchuria	Agency
37,597	Tires and tubes	Port au Prince, Haiti	Agency
37,600	Hose and mats	Hamburg, Germany	Purchase
37,605	Boots	Milan, Italy	Both
37,627	Rubber-stamp equipment	Prince Rupert, Canada	Purchase
37,722	Technical goods	Wellington, N. Z.	Agency
37,737	Druggists' and surgeons' goods	Bombay, India	Agency
37,746	Automobile accessories	Vienna, Austria	Agency
37,767	Overshoes	Berlin, Germany	Agency
37,768	Surgical goods	Vienna, Austria	Agency
37,770	Overshoes, gum boots, hoods, galoshes and tennis shoes	Milan, Italy	Agency
37,772	Fishermen's boots	Oporto, Portugal	Agency
37,773	Puncture-proof solution for tires	Singapore, S. S.	Agency
37,774	Household articles	Madrid, Spain	Purchase
37,790	Shoes and coats	Hamburg, Germany	Purchase
37,795	Druggists' sundries	Montreal, Canada	Both

The Rubber Industry in America

OHIO

The Akron Section of the American Chemical Society held a meeting on March 22 at the Firestone Club House, Akron, O. Dr. F. E. Bartell, professor of colloidal chemistry in the University of Michigan, spoke on "Studies on Adhesion." A dinner was served at 6:30 p. m.

The Akron Section held a dinner-dance and bridge on March 23 at 7 p.m. in the Goodyear dining room. About sixty couples attended.

Phil J. Kelly, advertising manager of The B. F. Goodrich Rubber Co., Akron, O., recently planned a trip from Akron to San Antonio, Tex. "Cy" Caldwell, pilot of the Goodrich Silvertown plane, took Mr. Kelly under his wings. The trip was made in three hops, one stop at Indianapolis and another at St. Louis. Flying is not a novelty to Mr. Kelly as he was an army pilot during the World War. I. W. Smalley, latest addition to the pilot personnel of the Silver Fleet, accompanied Mr. Kelly. It was his first flight.

"Cy" Caldwell is one of the oldest veteran aviators in point of service. "Cy" pilots Goodrich executives on hurry-up trips to all parts of the United States and to the Canadian Goodrich plant at Kitchener, Ont. The veteran pilot was among the searchers for Nungesser and Coli when those daring French aviators were lost on their attempted Trans-Atlantic flight. Caldwell is a contributor to aviation magazines. His articles on the navy versus aircraft have created widespread interest in aviation circles.

The Textile Rubber Co., Medina, O., announces the acceptance of the resignation of its factory manager, C. H. Keller, who becomes general manager of The Swan Tire & Rubber Co., Bucyrus, O. J. R. Hollingsworth, formerly in charge of development, has been given temporary charge of the factory. R. M. Cameron is in charge of sales, and G. Webb is production superintendent.

Since moving to Medina from Akron, the company has grown steadily and the capacity of the plant for the coming year has been booked. New employes and new equipment are constantly being added. Plans are being made to add a tube department for the production of tube machine products. The policy of allowing visitors to inspect the plant on special days each week has proved popular. The training school and the system of paying employes, eliminating the piece-work plan, satisfy the workers as well as the management.

The Cincinnati Rubber Mfg. Co., Cincinnati, O., has awarded a contract to the Austin Co., for a new building one story high, 100 by 75 feet. This building is required to provide for the expansion in the roll covering department. Another contract has been awarded to H. C. Hazen Construction Co. for a one-story addition, 50 by 130 feet, to the belting department.

Service Records of Goodrich Employes

Miss Hattie A. Hutton, in charge of the files of the advertising department of The B. F. Goodrich Rubber Co., Akron, O., holds the most unusual record of not having been late to work one time during the twenty-five years she has been in the employ of the company. On March 23, Miss Hutton celebrated her silver jubilee as a Goodrich employe and on this occasion was the recipient of personal congratulations from President James D. Tew.

On December 29, 1928, P. W. Leavitt celebrated his forty-eighth anniversary as a Goodrich employe. For the past several years, he has been historian of the company and his active mind is filled with humorous, romantic, and some rather dramatic events in the history of Akron's pioneer rubber manufactory. Mr. Leavitt also was congratulated by President Tew.

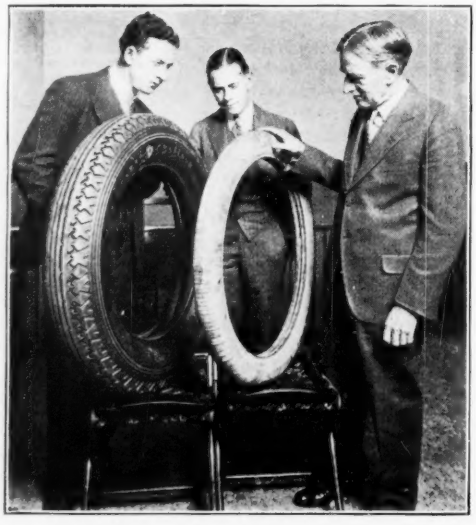
Recently, A. H. Hibbard retired after thirty-four years of service. His office associates presented him with the desk he had used so many years.

Lieut. Commander John Farnsworth, formerly of the United States Navy, has joined the aeronautic department of The Goodyear Tire & Rubber Co., Akron, O., as a pilot for one of the new dirigibles now under construction. He becomes the seventh member of the Goodyear staff of active dirigible pilots. The others are J. Boettner, K. L. Ficknus, V. L. Smith, Karl Lang, A. C. O'Neil, and B. F. Campbell. Goodyear now has four ships larger than the "Puritan" under construction, which with the "Pilgrim" will make a fleet of six ships in operation in the near future.

The Republic Rubber Co., Youngstown, O., now makes rubber rugs at the rate of 1,000 a month. There are two types: the rag-rug variety for homes and offices, and the non-skid type for airplane cabins. The rugs are turned out in a number of designs and are washable and sound-proof. The company at present employs 800 workmen and plans to increase this force to 1,000.

J. C. Drouillard Co., Cleveland, O., supplies to the rubber trade, rosin, turpentine, pine tar, rosin oil, and ultramarine blue.

The Lambert Tire & Rubber Co., Barberton, O., has been declared insolvent in a report filed in the common pleas court. The plant has been operated by J. W. Dessecker, secretary of the company, as receiver during the bankruptcy hearings. Sales of the fixed assets which total $215,000 will be necessary to pay creditors since the assets are $305,000 and liabilities are $505,000.



Harvey S. Firestone and his sons, Russell A. and Harvey S. Jr., comparing a Firestone wrapped-tread, 2-cure, 32 by 3½ casing made in 1912, with a 1929 Firestone Supreme Balloon tire. The 17-year-old tire has been added to the Firestone collection in Akron, O.

R. B. Koontz, at a special meeting of the board of directors of the Adamson Machine Co., Akron, O., was elected president and general manager to succeed the late Alexander Adamson. Mr. Koontz had been secretary and treasurer. C. L. Fenn, formerly assistant treasurer, was selected to act as secretary and treasurer, and L. S. Dudley was elected assistant secretary and assistant treasurer. W. E. Slabaugh was chosen as a director to fill the vacancy caused by the death of Mr. Adamson.

H. R. Baker, for the past seven years advertising manager of the Miller Rubber Co., Akron, O., resigned on April 15 to become vice-president of the Gardner Advertising Co., St. Louis and New York. Prior to joining the Miller company in 1920, Mr. Baker was a member of the advertising and publicity staff of The Goodyear Tire and Rubber Co.

Auburn Rubber Corp., Auburn, Ind., the controlling interest of which was recently taken over by the W. B. Foshay Co., is devoted to the manufacture of shoe soles, sponge and velvet rubber, rubber flooring, tires and tubes, cement-on soles, and molded rubber specialties. A. L. Murray, the founder and former president of the Auburn Rubber Co., continues as president. A. J. Kirstin is vice-president and general manager.

The Dayton Rubber Manufacturing Co., Dayton, O., is completing plans for an addition to its mill to be one story high, 180 by 300 feet, costing approximately $100,000 including machinery. After the addition is completed, a large increase in the tire and tube capacity of the Dayton factory will be arranged.

Howard Manufacturing Co., Toledo, O., recently was organized to produce rubber bulbs and sundries, and tubing and specialized hose for air and liquid. The officers are: Allen Gutchess, president; Frank Bailey, vice president; F. C. Penoyar, secretary; Walter Conklin, treasurer; and Charles Green, general manager.

Charles A. Soch, who recently resigned as chemist for the Overman Cushion Tire Co., Belleville, N. J., is now chief chemist for the Swinehart Tire & Rubber Co., Akron, O.

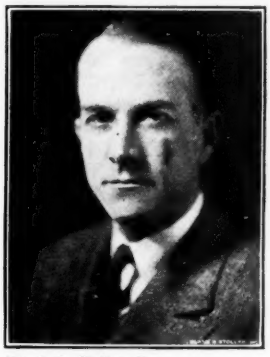
The Rubber Association of America, Inc., 250 W. 57th St., New York, N. Y., held a meeting arranged by the accounting committee for a discussion of specific accounting problems within the industry at the Akron City Club, Akron, O., on March 29. The subject assigned for the meeting was "Forecasting Raw Material Requirements and the Accounting Control of Materials." A most interesting and informative discussion was had under the leadership of W. M. Bechler, assistant comptroller of The B. F. Goodrich Co., Akron, O.

The meeting was not confined to members of the accounting committee and was well attended, for thirty-three members and guests, representing twenty-two companies, were present.

The next meeting of the committee will be held in New York in May.

Sales Promotion Executive

THE man in charge of sales promotion work for the New York district of The B. F. Goodrich Co., Akron, O., has won his position by his indefatigable efforts and long experience in that field. Ernest Rodham Kenner is the man.



Blank & Stoller, Inc.

Ernest R. Kenner

He was born in Atlanta, Ga., on September 8, 1885. His years of schooling culminated with his graduation from Georgia Institute of Technology in 1907 with the degree of mechanical engineer.

From 1907 until 1916 Mr. Kenner was associated in various capacities in engineering, estimate, and sales work with Allis-Chalmers Mfg. Co., in Milwaukee, Atlanta, and Cleveland. He was then appointed chief engineer of Plant 2, Firestone Tire & Rubber Co., Akron, O. He resigned this position in 1917 to enter the service of the United States as mechanical superintendent at Muscle Shoals. He completed this project shortly after the Armistice and went to Wellman, Seaver, Morgan Co., as assistant general sales manager in direct charge of hydraulic turbine and penstock valve sales. After five years, he became affiliated with the Goodrich company doing sales promotion work in the South. He was advanced to his present position on January 1, 1928.

Mr. Kenner is a member of long standing in the American Society of Mechanical Engineers. He is also a Mason, Cleveland City Lodge, Cleveland, O.

His business addresss is The B. F. Goodrich Co., 33 W. 60th St., New York, N. Y. His home is located at 5 Savoy Park, Woodcrest Avenue, White Plains, N. Y.

Goodyear Expansions and Personnel Changes

THE decision of The Goodyear Tire & Rubber Co., Akron, O., to build a 50,000 spindle tire fabric mill at Rockmart, Ga., was announced April 1 by C. C. Slusser, vice president and production manager of the company. The new mill is expected to be completed by next Fall and will employ 1,100 persons. The Goodyear company purchased 350 acres of land at Rockmart, which has a population of 2,500. Four hundred houses will be built for employes.

Rockmart is 14 miles north of the company's present southern cotton mill at Cedartown. The production capacity of the latter recently was increased from 35,000 to 50,000 spindles.

Other manufacturing units to be completed by the Goodyear company in its expansion program this year are the new southern tire and reclaiming plants at Gadsden, Ala., and an airship factory and dock at Akron, O., to be the world's largest single-story building under one roof, in which will be assembled the first of the two Goodyear-built rigid airships for the United States Navy.

Establishment of the new fabric unit will give the company 6 mills for the manufacture of its own requirements, further enabling it to provide a great share of the tire fabrics used in Goodyear's 8 tire plants throughout the world.

The Goodyear company has reorganized its sundries sales department after the resignation of C. M. Piper. Paul Coste is now manager of the department handling rubber flooring and tile sales. M. K. Moore is in charge of accessories sales, and J. G. Scales heads repair material sales. The latter two are responsible to F. L. Morgan, manager of automobile tire sales.

The Goodyear company has been permitted by the United States War Department to use a hangar at Ross Field, Arcadia, Calif., for one year as a base for the assembling and operation of one of the new helium filled airships. The new airship will be christened the "Mayflower" and will visit all the leading cities on the Pacific Coast.

The Goodyear Tire & Rubber Co., Inc., Akron, O., at a meeting of the directors in March reelected its officers. They are: C. F. Stone, C. Slusser, C. A. Stillman, and R. S. Wilson, vice presidents; P. E. H. LeRoy, treasurer; and W. D. Shilts, secretary.

The A. Buxbaum Co. recently was incorporated at Akron, O., to manufacture tire patches and to handle scrap rubber. The company is located at 1025 Sweitzer Ave., and has already started production.

The officials include A. Buxbaum, W. L. McLaughlin, and D. Lundquist. For the past several years these three men were associated with the Leo Meyer Co., Akron, in a similar business. Mr. Buxbaum was president of the former organization for the last ten years, but resigned that position to join the new corporation on March 13.

C. E. Wagner, export manager The Miller Rubber Co., Akron, O., returned from a European business trip visiting 18 countries. "Everywhere," he said, "Akron-made tires were seen not only on American cars but also on foreign makes."

Obituary

A Veteran Rubber Reclaimer

CHARLES DEAN BONNEY, factory manager of the E. H. Clapp Rubber Co., Hanover, Mass., died on Monday evening, April 15, at the Robert Brigham Memorial Hospital, Boston, after a brief illness, in his sixty-second year.

Charles D. Bonney

Funeral services were held from his home on Broadway, South Hanover, on Thursday afternoon, April 18. One hour before the services the company's plant was shut down to enable the many employes who had worked with Mr. Bonney to pay tribute to his memory. The Rev. Dr. Wilson of the Unitarian Church, Norwell, conducted the services at the house and Hanover Cemetery where interment was made in the family lot. The pall bearers were Irving Kingman and Stanley Curtis, representing Hanover friends; Rawson R. Cowen and B. A. Holcombe from the factory; and C. H. Cornell and Harold P. Fuller from the Boston office.

Two open touring cars accompanied the cortege to the cemetery, conveying the floral tributes from his many friends and business associates.

Charles D. Bonney was born in Pembroke, Mass., on July 8, 1867, and received his education in the schools of that town and Hanover Academy. He was the son of J. Dean Bonney and Clara Mann Bonney, being a direct descendant of Thomas Bonney who settled in Duxbury, Mass., in 1640. On August 26, 1890, he married Etta M. Stetson of Pembroke who survives him. The following year he entered the employ of the E. H. Clapp Rubber Co. where he served continuously for thirty-eight years, having been at his desk at the Boston office three weeks before his death.

Mr. Bonney was widely known in the rubber industry through his engineering and mechanical ability. He was a keen student of rubber machinery and processes, and his experience dated back to the days of the mechanical process, followed by the acid process to the still later development of alkali reclaiming. He was instrumental in the development and application of machinery from other industries to reclaiming, and took a keen interest in plant safety work.

A man of few interests outside of his business and his home, Mr. Bonney had a remarkable collection of historical relics, old books, and Indian tokens which reflected the background of historical Plymouth County. As historian of his company, he carefully preserved all the documents covering the growth of the concern from the days when Eugene H. Clapp, the founder, bought the old forge on the North River and began the reclaiming of rubber. He was a reader of the INDIA RUBBER WORLD for years, and his file of back numbers is one of the most complete in existence.

Always cheerful and smiling, he was a man of keen wit and a faithful friend to his associates and townspeople. His passing marks a distinct loss to the rubber industry.

Frederick W. Foote

FREDERICK WILLIAM FOOTE, for thirty-three years superintendent of the 'old Bourn Rubber Co. plant, 44 Warren St., Providence, Rhode Island, died on Sunday, April 14, at his home, 37½ Westfield St., after an illness of six weeks. He retired about three years ago when the business was taken over by the present Phillips-Baker Rubber Co. after the death of President Augustus O. Bourn. Mr. Foote was in his seventy-fifth year and was born in Colchester, Conn. He is survived by his wife, Anna, by a daughter, and two grandchildren.

Mr. and Mrs. Foote celebrated their golden wedding anniversary on February 20. Four generations were represented at a party held at their home on that date, Mrs. Julia King, mother of Mrs. Foote, who is 94 years old, being present.

Raleigh Bullard Adams

THE rubber industry lost another valuable worker on April 14 when Raleigh Bullard Adams died suddenly at the Newton Hospital. For the past ten years Mr. Adams was technical superintendent for the Stowe & Woodward Co., makers of rubber covered balls, Newton Upper Falls, Mass. Prior to this connection, he had been with the Boston Belting Co. for many years.

Mr. Adams was in his fifty-seventh year.

He was graduated from the Massachusetts Institute of Technology in 1894. He was a member of the University Club. During the War he served with the Newton Constabulary. He was a resident of Newton Highlands, Mass.

He is survived by his widow, Mrs. Margaret Adams; his mother, Mrs. Ellen Adams; a sister, Mrs. Holden; and a brother, Henry Saxton Adams.

H. J. DeLaney

ON April 6, H. J. DeLaney, salesman for The Republic Rubber Co., Youngstown, O., died at San Antonio, Tex., after a brief illness of less than a week. He was long and favorably known in the mechanical rubber field in the South. Before his association with the Republic company, which began five years ago, he had been connected with the United States Rubber Co. Mr. DeLaney is survived by his widow and two daughters.

Noted Advertising Man

KELLY-SPRINGFIELD TIRE CO. has lost a vice president and a legion of people has lost a good friend, for Maurice Switzer has died. Death claimed this prominent author, essayist, and adver-

Maurice Switzer

tising man on April 7 at Atlantic City, where Mr. Switzer had gone to recuperate from a nervous breakdown which had incapacitated him for about a month prior to his demise. But his heart had weakened, hastening the end.

Mr. Switzer was born on October 16, 1870, in New Orleans. His education was received in the public schools there. He came to New York, after working for a while in his native city, to act as advertising manager for the Havana-American Tobacco Co. Later, he went to the Wilson Distilling Co. in a similar capacity. When he left that organization ten years after, he became affiliated with the publications *Leslie's* and *Judge*. He devoted some time to free-lance writing.

Then began his association with the rubber industry. He joined the Kelly-Springfield company about fourteen years ago as an advertising manager and subsequently became vice president, a director and a prominent factor in the guidance of the affairs of the company. Mr. Switzer was largely responsible for that light and semi-humorous style that has distinguished Kelly-Springfield advertisements.

He wrote also several books of verse and stories of the advertising business to which he was devoted for almost thirty years. Among his popular works are: "Trying It Out on the Dog," "Wild and

Tame Advertising," "Letters of a Self-made Failure," and "Satire and Song." He was known for his invariable cheerfulness, his keen and quick wit, and the rich vein of clean humor that underlay all he did and endeared him to all with whom he came in contact.

Funeral services were held on April 10 at the Universal Funeral Chapel in New York. His widow, Sophie Switzer, survives him.

U. S. Rubber Company Pensions Old Employes

The Fells plant of the Boston Rubber Shoe Co. when permanently closed last month released a total of 331 employes, many of whom had served the company for very long periods. In recognition of its moral obligations to these faithful workers the company granted pensions to 26 of the number.

Employment was found for 105 employes either with other factories of the U. S. Rubber Co. or in outside activities. This left a considerable number whom the company felt were still entitled to some special consideration; so a policy was adopted of a so-called "termination wage." Every employe 45 years of age who has been 10 years with the company receives one week's pay for every year of service. Every employe who has 15 years of service regardless of age receives one week's pay for each year of service.

This is said to be the first time that such a liberal policy has been adopted by any company toward its employes. The amount of the "termination wage" will be slightly over $40,000, and the cost of pensions will be $17,000 a year, which will be paid to these people as long as they live.

When the Candee plant in New Haven, Conn., was closed, the company gave pensions and "termination wages" to a large number of old employes.

Boston Woven Hose & Rubber Co.'s Changes In Field Organization

The Boston Woven Hose & Rubber Co., Boston, Mass., announces a new addition to its sales staff, H. S. Merrill, who recently took over the Denver territory. Mr. Merrill is a man of long experience in the mechanical rubber goods business. He was for eight and a half years with the Boston Belting Co., in the southwest territory and has had also an extensive experience in the oil fields. Previous to that time he was for six years with The B. F. Goodrich Co., Akron, O.

C. W. Stanton, the former representative in Denver, moves to greater responsibilities in the Ohio territory with headquarters at Cincinnati.

After several years of service in Cincinnati, L. P. McGroff returns to New England where he will devote himself to a special type of field work in those states.

NEW ENGLAND

Nelson P. James, manager of the Miller Rubber Co. of New England, Boston, Mass., took over the distributership of the Miller tire about thirteen years ago. Since that time, he has been forced to find new and larger quarters on three different occasions. The growth of business soon made it necessary for him to erect a new headquarters building, in which he has located one of the most ideal super-service stations in the country. It is known as the Frank Ford Co. and is situated on Brookline Ave., in the heart of the tire and automotive section of Boston and is a real testimonial of the rapid growth and progress made by this company.

B. H. Capen, superintendent of the Clifton Manufacturing Co., manufacturer of rubberized clothing, Jamaica Plain, Mass., is spending his spring vacation with his father, Fred S. Capen of Harrisburg, Penn. Mrs. Capen accompanied him.

The United Tire & Radio Stores, Boston, Mass., have taken on a full line of Ajax Rubber Co. products. They also operate stores in Springfield, Lynn, and Cambridge. George Rubin is president.

Harry T. Wright & Co., Inc., Rockland, Mass., was granted a charter at the state house last month. Capitalization of $125,000 is reported. The company will manufacture and deal in rubber goods. A. E. Wright, Harry T. Wright, and Courtney S. Scott are the incorporators.

F. R. Starr and John F. Howard, representatives of the Boston Woven Hose & Rubber Co., Boston, Mass., entertained and instructed salesmen of the Vermont Hardware Co., the G. Blodgett Co., and the Blodgett Supply Co., at a meeting held in the Chamber of Commerce auditorium, Burlington, Vt., on March 29. The Boston men exhibited four reels of moving pictures showing the preparation of rubber in Ceylon, its processing in the manufacturing plant, and the actual operation of manufacturing hose, and a feature reel showing some of the products of the Boston Woven Hose & Rubber Co.

The Fourth Annual Banquet of the Heavy Goods Department Bowling League of the Hood Rubber Co., Watertown, Mass., was held at the American House in Boston last month. President Walter Bonnell presided. Following the dinner, prizes were awarded to Otto Nelson for the greatest increase in average; to Rogers Harwood for the highest single string; to Walter Bonnell for the highest three strings; and to "The Athletics" team of John Hoffman, Knut Nelson, V. Saporiccio, John Linnehan, and Louis Neal for first place. Prizes were presented by Superintendent of Department Charles Remington. The Shubert Theatre was attended in a body. The committee in charge included: John Hoffman, Charles Magurn, Archibald Williams, and Lawrence Perkins.

Manuel Costa, for the past three years with the Cambridge Rubber Co., Cambridge, Mass., and who is totally blind, was a participant in the annual B. A. A. Marathon held on April 19 at Boston. Costa has been training for long distance running over a long period of time and daily runs to and from his work. He has covered 16 miles in 1 hour and 55 minutes.

C. S. Pierce Co., 278 Montello Ave., Brocton, Mass., manufactures a complete line of shoe forms including fiber and celluloid shoe forms and rubber cement. The officers are: Harry H. Williams, president; and Bernard S. Sabean, treasurer. The directors are: Harry H. Williams, Alfred G. Legge, Shirley W. Farrar, Charles E. Hinckley, and Bernard S. Sabean. C. W. Barnes is advertising manager

Western Auto Supply Co., carrying a full stock of tires and tubes, has opened two new stores in Boston, Mass. E. H. Shore has been appointed manager of the store at 130 Brookline Ave., and E. L. Burgess has been made manager of the downtown store at 125 Federal St.

Expansion Program of Godfrey L. Cabot, Inc.

Stocks of carbon black in the hands of manufacturers have declined to about 33,000,000 pounds as against 108,000,000 pounds in January, 1927. Consumption is now approximately 1,000,000 pounds a day. Since it takes from three to six months to build the plants necessary to increase production, this stock is lower than the average reserve necessary to take care of variations in the rate of consumption. New plant construction now in progress virtually assures that the stocks will not continue to decline after May 1, and some overproduction during the summer months seems probable.

Much of the new plant construction is being done by Godfrey L. Cabot, Inc., Boston, Mass. This company alone increased its rate of production by 90,000 pounds daily in 1928 and is planning an increase of 110,000 pounds in its daily rate during 1929. Besides additions to its plants at Skellytown and Pampa, Tex., which are already the two largest carbon black factories in the world, it will build new plants at Kingsmill and Armstrong in the Texas Panhandle and at Seminole, Okla. The plant at Seminole will use as a raw material certain fractions of gasoline (principally propane and butane) which are rejected in the final refining process. Cabot will purchase these fractions on long-term contracts through its own pipe lines from several gasoline plants in the Seminole field. Preliminary tests indicate a high yield of carbon black of excellent quality. The initial capacity of this plant will be 20,000 pounds daily and, if successful, it will be enlarged.

Upon the completion of the plant at Kingsmill, Cabot's main research laboratory will be moved to that point.

NEW JERSEY

The output of tires and tubes shows a gain in some of the New Jersey plants, and it is now believed that the summer season will be a good one. The heel and sole industry is also very active with an increase in orders for athletic shoes. There has been little change in the hard rubber situation, although some factories say business is much better. The production of mechanical rubber products remains good.

William A. Howell, superintendent of Whitehead Bros. Rubber Co., Trenton, N. J., has been connected with that firm for the past fifty years. He began work with the concern after leaving school and held different positions until he was advanced to general superintendent several years ago. Mr. Howell is very popular with the many employes of the plant and is active in his work. He always takes a deep interest in the affairs of Trenton and for many years served on the Mayor's committee in charge of the Fourth of July celebration. Mr. Howell is also interested in the Crippled Kiddies Hospital at Trenton.

Whitehead Bros. Rubber Co., Trenton, N. J., is very busy in all its departments and is now operating at night along some lines of work.

Clifford H. Oakley, president of the Essex Rubber Co., Trenton, N. J., is one of the delegates of Trenton Council, Boy Scouts of America, to attend the Scout convention in New York on May 13 and 14. Mr. Oakley has always been active in Boy Scout work.

General C. Edward Murray, president of the Crescent Insulated Wire and Cable Co., Trenton, N. J., and his daughter Virginia have returned from an extended trip to Havana, Cuba.

Horace T. Cook, president of the Hamilton Rubber Co. and the Acme Rubber Co., Trenton, N. J., with Mrs. Cook is spending some time at Mountain Lakes, Fla.

The Goodyear Tire & Rubber Co., Inc., Akron, O., entertained Goodyear dealers in the Trenton district recently at a dinner in the Stacy-Trent Hotel, Trenton, N. J. The speaker was E. G. Shick, manager of the Philadelphia branch of the corporation. A motion picture, "Going Ahead with Goodyear," was shown.

Thermoid Company, Trenton, N. J., reports that business remains good with increased orders for brake lining.

Joseph O. Bauer, secretary of the company, recently gave a talk on 'Brake Linings" before members of the Trenton Rotary Club.

The Pierce-Roberts Rubber Co., Trenton, N. J., is operating overtime in its press room in producing molded rubber goods.

The Combination Rubber Co., Trenton, N. J., announces that business shows considerable improvement over last month and that orders are on the increase.

The Essex Rubber Co., Trenton, N. J., reports that business is very active and that the outlook for the coming season is very good. The approach of warm weather has increased the demand for rubber soles and heels.

The Lambertville Rubber Co.'s plant at Lambertville, N. J., has been purchased by Dr. Peter C. Fireman, president of the Magnetic Pigment Co., Trenton, N. J. The consideration was estimated to be about $100,000. Employment for more than 400 men will be provided when the rubber manufacturing operations are renewed. It is planned to manufacture rubber boots and shoes on the same plan as heretofore. Last December the Citron-Beyer Co. and the Frank Millner Co., Trenton, N. J., at a receiver's sale purchased the plant, which has been closed for more than a year.

The New Jersey Rubber Co., Lambertville, N. J., is very busy at the present time in reclaiming rubber. The concern has been prosperous all winter.

The Swinehart Tire & Rubber Co.'s building at 238 Central Ave., Newark, N. J., has been leased for a long term by William J. Stevenson, agent for the Ajax Rubber Co. The new tenant will take possession in a few weeks. The Swinehart company has leased another building on Central Ave.

The Ajax Rubber Co.'s plant at Trenton, N. J., which has been idle for more than a year, has been placed on the market. The plant was one of the most modern factories of its kind in the country. Nearly 1,200 hands were employed there at one time. The place was closed after the owners decided to combine it with the factory at Racine, Wis.

The United States Rubber Co.'s holdings in New Brunswick have been placed on the market. These plants include the India Rubber Co. and the home office of the concern. The India Rubber Co. was on the market once before but was withdrawn. The company later decided to lease the buildings for lofts. Rubbers and boots had been manufactured there, but the plants have been idle for a number of years. The annual meetings of the board of directors have been held for many years at the home office at New Brunswick, but these will now be held elsewhere.

The Capitol Rubber Co., Trenton, N. J., has resumed operations after having been closed for a few days because of a strike. The company announced a cut in wages and the majority of the employes left. The places of the strikers were soon filled.

William R. Thropp & Sons Co., Trenton, N. J., announces that it will give several cash prizes to students of the Trenton School of Industrial Arts who complete the best pieces of work in the various classes of machine shop practice. The Thropp company increases the prizes each year.

Murray Rubber Co. to Operate Chain Stores

A chain of 1,000 stores will be opened in the southern states by the Murray Rubber Co., Trenton, N. J., to sell automobile tires and tubes direct from the manufacturer to the consumer. Announcement of this important development was made by C. Edward Murray, Jr., president of the Murray company, and by Caldwell & Co., bankers, Nashville, Tenn. The stores are to handle the products of the rubber company in which Caldwell & Co. has a substantial interest. The plan of the Murray Rubber Co. commended itself to the bankers because it will save money for the car owners and will stabilize the tire business wherever the Murray stores are located.

Roger Caldwell, president of Caldwell & Co., in a statement regarding his company's interest in the plan said:

"In connection with our recent acquisition in the Murray Rubber Co. I feel that the chain store sales program, as worked out by the company, is a very comprehensive one. I want to see it pushed as rapidly as possible in the southern territory, as we are anxious to see the South derive the benefits it will bring to the automobile owners and business interests generally."

The Murray Rubber Co. for 15 years made tires for Sears, Roebuck & Co. These tires were sold under the trade names of "Justice" and "Master Justice," and as such have become known to millions of automobile owners who purchased them through the mail-order house.

The new system of selling is an improvement upon the mail-order plan. The Murray company will distribute its entire output with the most liberal and strongest guarantees, through stores located in southern cities. The Murray Tire Stores will be an integral part of the life of the city or town in which they are located. Wherever possible, an old-established dealer will be given the Murray Tire Store, and where it is necessary to open new stores, they will be manned and operated by the people of the territory they serve.

This system is meeting with success, according to a statement issued by the concern. Large consignments of tires and tubes are now being shipped to the South.

Rubberized Cores for Casting

Experiments supplementing those noted by the U. S. Bureau of Standards, and cited in India Rubber World, Nov., 1928, p. 60, confirm the superiority of rubber solution as a binder for foundry cores over green sand alone or admixed with linseed oil. It is held that clay content must be very low, and it is stated that small cores made in this way from coarse sand may be used at once. The addition of benzidine or para-amino-phenol to the rubber binder is said to give stronger cores. Balata in benzene makes cores that are soft at 37° C., but hard when cool. Thermoprene binders are also found much stronger than those made with linseed oil.

RHODE ISLAND

The Tubular Woven Fabric Co., Pawtucket, Rhode Island, has been sold to the Anaconda Wire & Cable Co., a subsidiary of the Anaconda Copper Mining Co. The sale was recommended by the directors and ratified by the stockholders early last month and the legal transfer occurred on April 15. The exact amount of money involved was not made public, but the terms of the purchase offer stipulated the exchange of 23,400 shares of the Anaconda Wire & Cable Co. for all the corporate assets of the Tubular Woven Fabric Co. Since the stock of the Anaconda subsidiary is said to have a current market value of better than $75 a share, the 23,400 shares offered for the Tubular Woven Fabric assets might represent a valuation placed upon the Pawtucket concern of perhaps $1,750,000.

According to a letter sent to the Tubular Woven Fabric stockholders by William Sprackling, president, each stockholder will receive approximately four shares of Anaconda Wire & Cable stock for each share of Tubular Woven Fabric Co. which he owned. Fractional shares will be adjusted in cash. It is said that actually the sale will result in an exchange on a 4 4/10 share for 1 basis.

The Tubular Woven Fabric Co. was incorporated in 1912 under the laws of Rhode Island with an authorized capitalization of $500,000 and enjoyed rapid growth during the world war period. Last year, according to report, its gross earnings were in the neighborhood of $1,000,000. Products consist of insulated wire, metal covered electrical insulators, conduits, and tubular webbings. Approximately 275 persons are employed.

The Washburn Wire Co., Phillipsdale, Rhode Island, earned a total profit of $1,233,129.15 in 1928 after allowance for depreciation and and a reserve for taxes, according to the annual report submitted to the stockholders at the annual meeting the past month by the president, Frank N. Phillips. These earnings are equivalent to approximately $24.66 a share on the 50,000 shares of common stock outstanding on which the current dividend rate is $10 a share annually. At the annual meeting of the stockholders the following officers and directors were elected for the ensuing year; president, Frank N. Phillips; vice president, F. C. Weidenmiller; treasurer, Fuller F. Barnes; comptroller, J. E. Hayward; secretary, W. C. Ingerson; and counsel, A. R. Palmer. Directors: Frank N. Phillips, J. E. Hayward, F. C. Weidenmiller, Donald E. Jackson, Thomas Wray, Fuller F. Barnes, Albert R. Palmer, Walter C. Ingerson, and J. B. Moff. Of the 50,000 shares outstanding 43,000 were represented at the meeting, either by personal attendance or by proxy.

The National India Rubber Co., Bristol, Rhode Island, reports the following changes in organization at the factory. C. J. Gallagher, formerly foreman of the packing department, has been made foreman of the carton department. G. A. Stuart, formerly assistant foreman of the packing department, has been made foreman of the last, heater, and packing departments; W. K. MacMillen, formerly foreman of the carton department, has been made assistant foreman in charge of the press department, and C. F. McElvogue, formerly foreman of the last department, has been made assistant foreman of the packing department.

The National India Rubber Co.'s daily production of the Keds Division was decreased approximately 10 per cent beginning April 29. Announcement of the proposed curtailment was made at a joint factory council meeting on April 10. The new schedule will involve the laying off of approximately 200 employes, those affected, in the majority of instances, having been employed at the plant less than ten years. Beginning April 13, Saturday work in the Keds Division was discontinued until further notice.

Arthur H. Carr, general manager of the United States Rubber Co., with headquarters at Providence, Rhode Island, sailed recently for Europe on a business trip through England, France, Italy, and Germany.

E. I. Kilcup, assistant treasurer of the Davol Rubber Co., Providence, Rhode Island, and a director of the National Association of Credit Men, was the speaker at the last monthly meeting of the Rhode Island Purchasing Agents' Association held at the Narragansett Hotel in Providence. His subject was "Credit Crime."

James J. Drummey of the National India Rubber Co., Bristol, Rhode Island, was elected president of the United States Rubber Co. Club of Rhode Island at a meeting held in Providence early the past month. Other officers chosen were as follows: vice president, Joseph T. Brogden, Providence; secretary, Edward S. Edwards, Providence; financial secretary, Harold A. Castings, Providence; treasurer, Albert L. Allen, Providence; board of governors, Christopher A. Ostby of Bristol and Thomas Lalor of Millville, Mass.

Frank B. Wilson, who died recently in Conshohocken, Pa., was well known in Bristol, Rhode Island, having been employed by the National India Rubber Co.

THE RETAIL VALUE OF ALL NEW CARS sold in the United States last year was approximately $2,820,720,000, according to the statistical division of the American Motorists' Association. The retail value of used cars sold during the year was in excess of $1,646,880,000, it was estimated.

Activities of the Rubber Association of America

A special meeting of The Rubber Association of America, Inc., will be held at the Hotel Plaza, 59th St. and Fifth Ave., New York, N. Y., at 11:00 A. M. (Daylight Saving Time), on Friday, May 10, 1929.

This special meeting is called under the authority granted by and in accordance with the provisions of Sections 2, Article X, of the Constitution and By-Laws of the Association.

The purpose of the meeting is to consider the following proposals: (1) Change in Name to "The Rubber Manufacturers Association, Inc."; (2) Amendments to Constitution and By-Laws.

The Rubber Association of America, Inc., at a meeting of the Footwear Division, held at the Yale Club, New York, N. Y., on April 4, elected T. J. Needham of the United States Rubber Co., New York, N. Y., chairman of the division and M. R. Stevenson of the Hood Rubber Co., Watertown, Mass., vice-chairman, for the current year.

It was decided to compile monthly statistics of production, sales, and inventories of rubber footwear. The work of compilation will be done by the Rubber Association. The survey will be made in two parts—one in November of each year, covering dealers' stocks of canvas rubber-soled footwear, and the other in March covering all waterproof rubber footwear.

S. T. Campbell, of the Aetna Rubber Co., was elected chairman for 1929 of the Hard Rubber Manufacturers' Division, Rubber Association of America, Inc., at a meeting of the division held last month at the Yale Club, New York, N. Y.

Institute and Association Merger

A meeting has been called for May 10 in New York City when members of the Rubber Institute, Inc., and the Rubber Association of America, Inc., will take action regarding a merger of the two organizations in a new cooperative association of rubber manufacturers.

Witco Enlarges Century Carbon Co.

An important enlargement of the manufacturing facilities of the Century Carbon Co., 365 E. Illinois St., Chicago, Ill., was announced by Robert I. Wishnick, president of Century Carbon Co., and of Wishnick-Tumpeer, Inc., 251 Front St., New York, N. Y., which owns and controls the former company.

Further access to a gas supply of 3,000 acres in a solid block of proven gas acreage in the Richland, La., field permits expansion. Four new units of thirty-two houses each, with a gasoline extraction plant, will add 10,000,000 pounds annually to the present production. Mr. Wishnick states that these units will be in production in ample time for next year's contracts.

PACIFIC COAST

Goodyear Tire & Rubber Co. of California directors were reelected at the annual meeting of the stockholders in April at the factory office in Los Angeles. At the directors' meeting held afterward these officers were chosen: president, John W. Mapel; vice president and general superintendent, Edwin J. Thomas; treasurer, J. S. Willaman; secretary, H. J. Young; assistant secretary, J. L. Goddard; and chairman of the board, Paul W. Litchfield, president of the parent Goodyear company in Akron. Other members of the Los Angeles personnel include J. X. Kennelly, advertising manager; E. D. Alvord, manager of the technical department; Paul Beebe, chemist; J. W. McGrath, compounder; J. K. Hough, sales manager; and Chas. H. Williams, assistant sales manager. The company's average production of tires is 12,500 a day, and the works are running on three shifts a day. The extensive rearrangement of the manufacturing end of the plant by which production can be increased soon over 50 per cent without additional building construction will be completed early in May.

The company has promoted N. W. McEachern, ten years a Goodyear salesman in Portland, to the position of special representative for bus and tire sales in the Sacramento, Calif., territory, according to A. L. Curtis, office manager of the Portland branch.

Goodyear Textile Mills, Los Angeles, Calif., which operates in connection with the Goodyear tire plant and supplies the latter with its fabrics, has elected these officers: president, John W. Mapel; vice president and general superintendent, Edwin J. Thomas; treasurer, J. S. Willaman; secretary and controller, H. J. Young; and assistant secretary, J. L. Goddard.

Super Mold Corp., Lodi, Calif., makers and lessors of full circle supertreaders, according to G. O. Beckman, sales manager, is adding another unit to its products which will be shortly placed on the market, which, it is said, will greatly simplify the operation of treading or retreading.

Mohawk Rubber Co., Akron, O., has recently been making a direct study of coast trade conditions through President S. F. Miller; his son, H. F. Miller; and Vice President and Sales Manager J. F. Jones. Their journey included most of the territory between San Diego and Seattle.

Eno Rubber Corp., Los Angeles, Calif., meeting in April at the new offices and salesrooms 110-114 E. 17th St., reelected Roy R. Musser, president; R. M. Alcock, vice-president; and G. K. Norton, secretary-treasurer. At the factory in Torrance, Calif., the company is operating on a 24-hour daily schedule, including Sundays, the productions including oilfield supplies, bath mats, sport balls, inflatable seat cushions, radiator hose, tire repair materials, patented specialties, and general mechanicals.

Green-Monroe Wonder Rose Shop, manufacturing rubber flowers, has moved from 1355 to 2132 Sunset Blvd., Los Angeles, Calif., in order to increase operations and provide for display of products. The latter are chiefly absorbed by motion picture studios and department stores.

Natural Bitumen Products Co., 835 Howard St., San Francisco, Calif., has, according to John F. Janssen, general manager, contracted with a leading tire manufacturing company of Akron to take its entire output of mineral rubber for many months to come. The company operates a unique plant 1,000 feet off shore on a part of Great Salt Lake, Utah, and during the warm weather pumps the semi-fluid material into containers on the land. The company is arranging to install a steam-heating system to enable it to conduct its operations also in cold weather.

Miller Rubber Co., Akron, O., has lately been making a thorough survey of coast trade conditions through its vice president and sales manager, L. C. Rockhill, who has been visiting all the principal cities between the Mexican and Canadian borders.

One Million Tires Made by Pacific Goodrich

Pacific Goodrich Rubber Co., Los Angeles, Calif., although in operation less than a year, made its 1,000,000th tire April 15, and is rapidly stepping up production to meet pressing demands in the eleven far western states served by the plant. Frank E. Titus, general sales manager, returned April 17 from a conference at the parent plant in Akron. Fred. S. Morley of the Akron company has been appointed treasurer of the Los Angeles company, and Norman Ruske has been transferred from Hartford, Conn., to Seattle where he will be Northwest District advertising manager. F. J. McCammon, twelve years with Goodrich, has been appointed Oakland branch manager.

The big Goodrich event of the past month was the arrival of the Silver Fleet on the 29th at the Coast and for which event an elaborate program of ceremonies had been arranged. Some of the features marking the reception of the fleet were an entertainment and banquet at the Los Angeles plant; greetings from the mayor, city, county, and other officials; trips to the motion picture studios; and a visit to the U. S. Naval Fleet at the harbor. The Silver Fleet of fourteen cars of various makes, in charge of Lieut. H. R. Schaeffer, veteran navy plane pilot, had left New York City in January with a score of expert drivers and had arranged to make a circuitous journey of 30,000 miles in order to test Goodrich tires under all kinds of driving conditions. The cost of the trip will be over $200,000 and it skirts the boundaries of the nation.

Samuel Broers, of Akron, vice president of the Firestone Export Co., the foreign merchandising branch of the Firestone Tire & Rubber Co., and a noted expert on export trade, has just returned from a trip to Australia and New Zealand, where he made a close study of business conditions.

M. E. Dorman, president of Ever Ready Rubber Products Co., 12th & Howard Sts., San Francisco, Calif., recently returned by airplane from a business trip to New York City. His concern has lately enlarged its plant, and now has four times the factory room which it had in its former location at 1058 Mission St. The company manufactures an extensive line of dress shields, cannery, household, and chemical workers' aprons, infants' rubber wear, gum sheetings, sanitary skirts, shower curtains, and other articles of sheet rubber and rubber fabric.

Lombard J. Smith Co., 324 N. San Pedro St., Los Angeles, Calif., are manufacturers' agents for Utility Manufacturing Co., Cudahy, Wis., New Haven Sherardizing Co., Pierce Wrapping Machine Co., Diamond Swing Joint, Ideal Electric & Manufacturing Co. products, and Crescent Truck Co. vehicles.

Pennsylvania Rubber Co. of America, through President W. O. Rutherford, announces the appointment of the Colburn-Schroeder Co., of which Jas. P. Mulligan is general manager, as exclusive San Francisco distributers. This concern, which is located at 167 Hayes St., has long been prominent in automotive circles on the Coast.

E. M. Smith Co., 637-639 Clarence St., Los Angeles, Calif., of which E. M. Smith is president, has incorporated its brake-lining division with mills at Downey, Calif., under the name of the Emsco Asbestos Co. J. G. McGurn is secretary-treasurer. The Los Angeles works are unusually busy with the production of belting, hose, and general mechanical rubber goods, the oil industry absorbing a large part of the output, and additions are being steadily made to its mechanical equipment

Brown Tube Corp., Graybar Building, New York, N. Y., has appointed E. D. Eddy, formerly of Eddy & Clark, advertising agents, Akron, O., as chief Pacific Coast distributer of its puncture-proof tubes with headquarters at 667 Folsom St., San Francisco. He will establish branches at Portland, Seattle, and San Francisco.

Dr. W. F. Zimmerli, rubber technologist of the Roessler & Hasslacher Chemical Co., of Akron, O., made a recent business trip to the Coast.

C. Kenyon Co., Brooklyn, N. Y., has appointed John P. Costello general manager of the company's tire and rubber goods branch at Van Ness and Ellis St., San Francisco, Calif.

Ajax Rubber Co., Racine, Wis., has appointed A. E. Boal, formerly Los Angeles branch manager, as South California district manager. He will also handle McClaren and Racine tires.

Rex Rubber Co., Los Angeles, Calif., specializing in rubber heels, soles, and various patented articles, and of which Arnold Biethan is president, was incorporated in April with a capital of $25,000. The company, which had a disastrous fire a year ago, recently moved into its new building, 2456 E. 55th St.

Samson Tire & Rubber Corp., Los Angeles, Calif., is making rapid progress in the erection of its big factory. The erecting crews are much ahead of their schedule, and the steel skeleton and a considerable part of the concrete work are completed. Many of the heavy machines have already been put on their foundations, and company officials believe that the plant may be in operation fully a month before the date originally set for its opening. The purchasing department has ordered and handled over 4,000 different items. In every instance, it is stated, the newest types of machinery have been specified, so that the plant when finished will be one of the most modern and efficient tire and tube-making concerns in the country. Business is bounding along, officials say, at a lively pace and the Compton and San Diego plants pushed to their utmost on 24-hour shifts are unable to keep up with the demand. Meanwhile the company is opening up new distributing stations throughout the country, and has lately placed some very large corporation orders.

Paragon Rubber Products Co., 4827 Huntington Drive, Los Angeles, Calif., has just installed an additional large press and a hydraulic pump and is working 24 hours a day on oil-well supplies and general mechanical goods. Within six weeks the concern expects to put a new nonpuncturable inner tube on the market. It will be known as the improved Privett and have fabric reenforcing. Harold G. Cogswell is president and treasurer, James Nation vice president, and Abraham Roofsinger secretary.

Pacific Golf Ball., Ltd., 200 Davis St., San Francisco, Calif., of which Charles P. Henderson is president, opened a branch in April at 1035 S. Broadway, Los Angeles. The company has the balls manufactured according to specifications in an eastern factory and does a large business selling direct to consumers. Later, it is said, if business warrants it may erect a factory of its own or purchase one of several said to be in the market.

Paterson-Ballagh Corp., Wilmington Blvd., Los Angeles, Calif., expects to do a business of over $1,000,000 in 1929 in the making of patented rubber protectors for pumps in oil fields. The concern was established fourteen months ago by C. L. Patterson and Jack C. Ballagh. Two other rubber oil-proof specialties will also be marketed.

Sherbondy Rubber Co., Norwalk, Calif., of which E. L. Sherbondy is president and Geo. Ledoux secretary-treasurer, is reclaiming much rubber under the Sherbondy process, and all of which it uses in the making of tire-repair stock, oil-pump packings, and for hard rubber toilet seats.

Xylos Rubber Co., Los Angeles, Calif., which is one of the Firestone enterprises, is now reclaiming, it is stated, an average of 60,000 pounds of rubber daily, including some 22 varieties made on customers' specifications. Within a month, output, it is estimated, will reach the capacity of the big, modern plant.

West American Rubber Co., 400 N. Ave. 19, Los Angeles, Calif., of which Douglas Radford is president, reports business unusually brisk in oilfield supplies for American and foreign fields, tire repair materials, patented heels, and many mechanical specialties. Among other articles of machinery lately ordered was a large Banbury mixer.

Firestone Establishes Super-Service Stations

Harvey S. Firestone, president of the Firestone Tire & Rubber Co., Akron, O., and his two sons, Harvey S. Firestone, Jr., in charge of the Firestone Liberian rubber plantation, and Russell A. Firestone, vice president of the Firestone Tire & Rubber Company of California, were recent visitors at the new Los Angeles plant, and incidentally studied coast trade conditions at close range. They remarked that the headway made by the Los Angeles plant has in the short time that it has been in operation exceeded their most confident expectations. During their stay they were the guests of General Manager R. J. Cope of the coast factory.

Mr. Firestone, Sr., is very optimistic regarding business conditions throughout the entire country during 1929, and is sure that the tire and automotive industries will share largely in the general prosperity. During his visit he also attended the opening of the new $500,000 plant of the Wynns Tire & Rubber Co., E. 8th St. and Towne Ave., Los Angeles, which is distributing Firestone tires at what is said to be one of the most complete super-service stations in the country. Mr. Firestone said that he is devoting considerable time to a plan for the establishment of superb one-stop stations throughout the country, and believes that such a system will serve most efficiently in the distribution of the products of the American tire factories, now totalling over $800,000,000 annually. There are already, he said, about 150 such stations located at key points in the country. The Liberian planting project is doing well, he said. About 30,000 acres are producing rubber, and another 50,000 acres have been cleared and are about to be planted. The Firestone factories, here and abroad, are now producing more than 65,000 tires a day.

Los Angeles Group Rubber Division A. C. S.

The sixth meeting of the Los Angeles Group, Rubber Division, American Chemical Society, at the Pollyanna Tea Room, 2228 W. 7th St., Los Angeles, Calif., March 29, proved to be one of the most interesting sessions yet held by the organization. President Pond expressed much satisfaction with the increased attendance, and took much pleasure in introducing as the speaker of the evening Dr. W. F. Zimmerli, rubber chemist, who is affiliated with the Roessler & Hasslacher Chemical Co. in Akron. His subject was "Vulcanization of Rubber," and he dealt with the theme theoretically and practically in such an unusual manner as to evoke many questions from his hearers, and all of which he took much interest in answering.

MIDWEST

Gilbert K. Trimble, until recently connected with the Seiberling Rubber Co., Akron, O., in compounding, factory service, and new products developmental work, is now chief chemist of the Midwest Rubber Reclaiming Co., E. St. Louis, Ill.

Ahlbell Battery Container Corp., Waukegan, Ill., manufactures hard rubber battery containers, composition battery containers, hard rubber covers and vent caps, motor coach and farm lighting hard rubber containers, and hard rubber molded goods. Its expansion schedule for 1929 calls for an expenditure of $50,000, which includes new equipment and a new 150 h.p. boiler.

The officers are: E. L. Byfield, president; Valle O. Appel, vice president; J. L. Hunter, factory manager; and J. N. Wall, superintendent.

Rubber Patents Corp., Grand Rapids, Mich., is considering the establishment of another factory outlet on the Pacific Coast for the manufacture not only of fabricated rubber balls, but also molded rubber balls, balloons, safety belts, etc. Negotiations are now pending for the merging of a prominent rubber company on the Pacific Coast with the Rubber Patents Corp.

J. A. Richards Co., Kalamazoo, Mich., manufactures die-making outfits for cutting molds used in the manufacture of automobile mats and other mechanical goods. J. A. Richards is president of the company.

CANADA

Rubber goods manufacturers believe that an advance in price of mechanical rubber goods is imminent, because the rubber market has advanced and the cotton market is also much stronger. Since the sales tax was reduced, there has been 1 per cent deducted from the face of the invoice on mechanical rubber goods, but this will also be taken into consideration when new prices are named. It is expected that tire prices also will be affected by this.

The basic rubber market has not been quite so strong recently, and expected advances in some rubber products have been considerably delayed on this account.

A reduction on rubber heels, amounting to approximately 10 per cent, has gone into force. The rainy weather during April has enabled the retailers to dispose of a large quantity of rubber footwear and clothing which otherwise would have been carried over until next season.

Dominion Rubber Co., Ltd., Toronto, Ont., inaugurated a new campaign of testimonial copy featuring Uskide Soles. The copy carries pithy testimonials from users and is illustrated with sketches showing the testimonial writers engaged at work. The company is also running full-page advertisements in the leading dailies throughout Canada in the interests of the Royal Master Tire.

Panther Rubber Co., Ltd. This Sherbrooke, Que., firm is using large-sized newspaper copy featuring Panco soles and heels. A recent advertisement states that over 5,000,000 pairs have been sold in the last ten years.

Canadian General Rubber Co., Ltd., held its annual meeting recently at the head office in Galt, Ont., at which a satisfactory year was reported. The old board of directors composed of Hon. J. D. Chaplin of St. Catharine's, G. C. McGee, also of the same town, William Kistler of Chatham, Chas. Black of Galt, J. J. Moriarity of Toronto, and E. Barrington, was elected.

A. Koehler, general sales manager of the Canadian Goodrich Co., Ltd., has written for the business trade mediums an illustrated article captioned "Rubbers," in which he describes the various kinds of rubbers manufactured as well as other matters of interesting and educational value.

Canadian Goodrich Co., Ltd., is adding two stories to the main building and one story to the wing, making the entire plant at Kitchener, Ont., four stories high. The present addition, costing $250,000, will increase the output of Silvertown tires and Goodrich rubber footwear 35 per cent. The company's prosperity is due largely to the capable management and enterprise of J. W. Jordan, general manager, and A. Koehler, sales manager, and to the fair-treatment policy which marks its relationships with employes, retailers, and consumers.

Canadian I. T. S. Rubber Co., Ltd., Toronto, Ont., has planned a definite advertising campaign and will feature, among other articles it manufactures, its rubber heels.

Montreal Aircraft Exhibition. The latest models in monoplanes, biplanes, amphibians, and sport planes, together with an array of aircraft accessories, will be shown at the second annual Montreal Aircraft Exhibition, to be held at the Stadium Building, Delormier Ave. and Ontario St., from May 4 to May 11 inclusive.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., has under way plans for another major extension to its plant, which will be a warehouse for storing materials and products. It will make room for more machinery at the main plant and enable the company to materially increase production of tires, tubes, and other products. The new building will be four stories and have a capacity for approximately 300,000 tires.

The company, under the slogan "Make this indisputable test," is featuring in large-sized newspaper copy its Supertwist Cord. Every Goodyear Selected Dealer has one of these cord-testing machines in which are fastened two tire cords of equal length—a Supertwist Cord and an ordinary tire cord—with which any one can make the experiment for himself. Supertwist is Goodyear patented, made in Goodyear cotton mills, and used only in Goodyear pneumatic tires.

Twelfth Exposition of Chemical Industries

The Twelfth Exposition of Chemical Industries will open May 6 at Grand Central Palace, New York, N. Y. There will be more than 450 exhibits of raw materials, chemicals, machinery, laboratory equipment and precision instruments. This exposition promises to be the most successful ever held. Among the rubber firms that will be represented are: The J. H. Day Co., Cincinnatti, O.; H. H. Robertson Co., Pittsburgh, Pa.; The Roessler & Hasslacher Chemical Co., New York, N. Y., and the United States Rubber Co., New York, N. Y.

Thursday evening, May 9, is the date of the Sixth Annual Chemical Industries Dinner at the Roosevelt Hotel.

E. I. du Pont de Nemours & Co., Wilmington, Del., has acquired the Krebs Pigment & Chemical Co., which will be organized under the laws of Delaware and with the same name. A. S. Krebs will be president of this new company.

Paul Elbogen & Co., Inc., crude rubber dealer, will move to 50 E. 42nd St., New York, N. Y., on May 1. The company will have direct wire service with the Rubber Exchange.

Rubber Physicist Joins Staff of Henry L. Scott Co.

The Henry L. Scott Co., well-known manufacturer of testing machines for the rubber and textile industries, has recently added to its staff William H. Whitcomb, who for the past twelve years was director of the Footwear Division Control Laboratory of the United States Rubber Co. at New Haven, Conn. In this position, he supervised the inspection of raw materials and finished products including

William H. Whitcomb

fabrics, rubber, and the full range of compounding ingredients that pass through a large rubber manufacturing plant.

Mr. Whitcomb was graduated from the Massachusetts Institute of Technology, B. S. in 1903 and M. S. in 1906. He was assistant in physics and electro-chemistry at M. I. T., 1903-1906. In the chemistry department at Miami University, Oxford, O., he was successively assistant professor, 1906-1910, associate professor, 1910-1913, and full professor, 1913-1917. In 1912 he graduated from Harvard University.

In addition to his activities as Director of the United States Rubber Co.'s Footwear Division Control Laboratory, Mr. Whitcomb is a member of the American Chemical Society, the American Society for Testing Materials, and its Committee D-13 on Textile Materials.

The B. F. Goodrich Rubber Co., Akron, O., held a two-day sales promotion meeting early in April at the Southern Manufacturers' Club, Charlotte, N. C. The meeting was attended by nineteen members of the company, including sixteen members of the field staff in the Carolinas. John Moser, branch manager at Charlotte, presided.

THE SUMMER MEETING OF THE SOCIETY of Automotive Engineers will be held in the Adirondacks at Saranac Lake, N. Y. The dates of the meeting are June 25 to 28.

The Rubber Industry in Europe

GREAT BRITAIN

The Merchandise Marks Act

The report of the Standing Committee under the Merchandise Marks Act respecting rubber manufactures was issued on March 5 as a Parliamentary paper.

The India Rubber Manufacturers' Association has not been able to obtain a decision in favor of an order requiring goods to be marked with an indication of their origin on importation. But the demand for a sale order, requiring marking of goods of foreign origin when on sale or exposed for sale, has been sympathetically considered.

The marking of the following goods has been recommended, the indication of origin being embossed, impressed, stamped, printed, or stenciled in specified positions:

Rubber in Sheets. Marked on the sheet at intervals of two yards.

Hose and Tubing. On a label securely attached to each coil.

Tennis and Golf Balls, Play Balls, Uncovered Beach Balls, Football Bladders. On the article and container.

Mats. On the mat or label.

Matting and Flooring. On a label.

Tiles. On the container.

Gloves. On one of each pair of gloves.

Rubberized Fabrics, including Hospital Sheeting. On a label or exposed part of each roll.

Valves. On the article, container, or label.

Surgical Goods. On the article, label, or container.

Horn Bulbs and Pedal Rubbers. On the article, label, or container.

Sports Grips. On each grip.

Stair Nosing. On the article at intervals of nine feet.

Aprons, Panties, Bibs, Bathing Caps. On the article, label, or container.

Tobacco Pouches and Erasers. On each article.

Soles and Heels. On the article, container, or card to which the articles are attached.

Tees and Ball Cleaners. On each article.

Ebonite Sheets of More Than Three-Sixteenths Inch in Thickness and Four Square Feet in Area. In one corner.

Uncovered Elastic Cords and Rubber Bands. On container.

Corks. On container.

Sponges. On container or label.

The Order-in-Council is recommended to go into effect three months after it is made.

The committee is not prepared to recommend the marking of toys, including balloons, wholly or chiefly of rubber, because of practical difficulties. Nor is an order recommended for carriage body blocks, drawback springs, railway vacuum brake fittings, belting, or ebonite combs. While an order is recommended for elastic cords, webbings, braids, and fabrics, it is considered undesirable that corsets, suspenders, and other articles made in England in which imported elastic is used should be required to bear an indication as to the origin of the elastic.

India Tire & Rubber Co.

The first annual general meeting of the India Tire and Rubber Co. (Great Britain), was held in Glasgow. This company, as is known, acquired a freehold site of 65½ acres at Inchinnan, Renfrewshire, on which there are now factory buildings covering over four acres. Production started within six months of the incorporation of the concern, and has since continued to increase rapidly so that in February of the current year the output had a value of £44,372. The plant is expected to be in full operation in April when it is hoped to produce goods to a value of at least £80,000 a month.

Profits for 1928 were £30,945, as compared with the prospectus estimate of £30,000 for the first year. A final dividend was paid, making the total for the year 8 per cent, besides a dividend of 17½ per cent on the deferred shares. Sales for 1929 are expected to come to £800,000, yielding a profit of £130,000, or 10½ per cent on the preferred and 67½ per cent on the deferred shares.

The capital has been increased from £125,000 to £750,000, and 400,000 7½ per cent cumulative participating shares of £1 each have been issued at the price of 21 shillings each, and 1,600,000 deferred shares of 1 shilling each at 2 shillings 6 pence each.

Institution of Rubber Industry

The Seventh Annual Dinner of the Institution of the Rubber Industry took place on April 25 in the Victoria Hall of the Hotel Cecil, Strand, London. Lord Colwyn presided.

According to a recent decision of the Institution, new members joining at the present time will have to pay only a fraction of the subscription due to August 31, 1929, that is 10 shillings 6 pence.

Herbert Rogers read a paper entitled "Some Aspects of Rubber Manufacture in America," before the London Section of the Institution of the Rubber Industry.

H. C. Young, of Chas. Macintosh & Co., Ltd., gave a popular lecture on the subject, "Why the Rubber Industry Is Where It Is," under the auspices of the Institution of the Rubber Industry, at the Blackfriars Theater, London, on March 18. Mr. Young has an imaginative and lively way of expressing himself and his audience listened with interest to what he had to say about the important part that rubber has played and is still destined to play in the development of civilization.

Turning from the general to the specific, he searched out the weaknesses of methods on the plantation, in the factory and the laboratory, and the sales department. The British manufacturers' methods of producing rubber goods were shockingly crude, and he pointed out that the cost of labor in the rubber manufacturing industry was quite out of proportion to the cost of material, except in the tire section. Thus, while the proportions of the cost of labor and of material in the tire section was 1:10, and in the electrical industry 1:6, in a well-organized rubber factory the proportion was 1:2, and in the average rubber factory 1:08. Again, whereas American manufacturers got 220 pounds of mixed rubber through the factories per horsepower, the figure in England was 80 pounds.

On the technical side, he stated that there was no really definite, clearly formed opinion upon the ingredients to make rubber compound. Some ingredients were added to a compound to dry it up, later something was put in to soften it, the original drying ingredient being left in because everyone was afraid to take it out. The number of ingredients had crept up from 5 to 14 over a number of years, and all of them were arrived at scientifically.

While quite free in his criticisms, Mr. Young did not forget to give credit where credit was due and paid a fair tribute to those responsible for the great developments brought about in the rubber industry, particularly in the last ten years.

Onazote for Refrigeration

The *India Rubber Journal* learns that Chas. L. Marshall, the originator of Onazote expanded rubber, is at present in the United States to start the American Onazote Co., with a capital of £5,000,000, for the manufacture of Onazote for American railroad refrigeration cars. The first car of 60,000 pounds capacity is already running on one of the leading railroads. The use of Onazote saves in weight, against the existing insulations, some 30 cwt. on each car. This, upon the usual refrigerator trains from California of 100 cars, makes a saving in dead weight of 150 tons. The Onazote car, it is claimed, will cost less to build than standard cars now in use. It is intended to produce 300,000 feet of 6-inch material, 1½-inch thick, weight 6 pounds per cubic feet daily, when the desired capacity has been reached.

GERMANY

Leipzig Spring Fair

Another Leipzig Spring Fair has passed and the verdict regarding its success is not very favorable. Prices again were too close to be sufficiently profitable and in spite of the fact that crude rubber, solvents, and wages have all gone up, finished goods remained at their former level and in some cases were lower in price. On the other hand, buyers keep aloof. The opinion has been expressed that buyers no longer find the Fair so attractive as formerly and are simply getting a little tired of it. This is not in any way diminished by the attitude of the authorities in charge of the Spring Fair, although in the present instance it is only just to admit that the arctic weather which visited Europe this winter had something to do with the reserve of buyers.

It has been remarked that whereas formerly large numbers of foreign buyers annually visited the fairs, thus giving them an international character, in recent years a significant change has taken place and foreigners come to Leipzig with exhibitions of their own products instead of visiting with the idea of buying German manufactures, a situation which Germans quite naturally do not relish.

Some of the Exhibits

Among the exhibitors was the well-known Pahlsche Gummi-und Asbest G. m. b. H., of Dusseldorf-Rath, which showed its new Paracord compressed air hose. As the name denotes, the hose is made up of rubber and a fine cotton insert built up like the fabric in a cord tire. Rubber mats which can be used for advertising purposes if desired, and a rubber hammer for technical purposes were also included in the exhibits of the above firm.

Peters Union A. G., Frankfurt a. Main, has taken up rubber floor coverings too and showed some good samples.

Blodner & Vierschrodt A. G., Gotha, had a large variety of technical goods, and the Continental Caoutchouc und-Gutta Percha Compagnie, Hannover, showed a fine line of sporting goods including a new and very handsome bathing slipper of rubber with a moire effect. The latter firm was another of those who have recently taken up rubber floor coverings, and besides the sponge rubber bath mats, there were mats made colorful and decorative by having the designs squirted on the surface.

Firma M. Steinberg specializes in certain novelties, such as rubber aprons, and had a particularly interesting collection of these goods, one style, coming in pastel shades with relief design of rubber, being especially attractive. There were also rubber capes for children, belts, and balls. The latter had the design printed on the surface and were sewed at the edges.

Vulkan Gummiwarenfabrik Weisz & Baessler A. G., Leipzig, always has some striking novelty on view. This time it was a pneumatic teething ring that can be taken apart.

Vereinigte Berlin-Frankfurter Gummiwarenfabriken, Berlin, had a good-looking overshoe of thin sheet rubber that fits the foot snugly. It comes in all the fashionable colors and may be had with or without lining, and with or without zipper fastening.

Zieger & Wiegand is a firm well known for its joker articles made of rubber and at the Fair it had added to its family of rubber fruits and pastries, a cucumber, confectionery, and zweiback.

Gummiwarenfabrik Saul G. m. b. H., Aachen, was represented by a full line of balls, also for watersports, the latter type attaining gigantic proportions. The collection of bathing caps included some fine gold and silver styles with very new impressed designs.

Continental Caoutchouc Report

Merger With Peters Union

The Continental Caoutchouc und-Gutta Percha Compagnie, Hannover, has just issued its latest business report. Trade during the past year was on the whole considered satisfactory, although the results bear no comparison to the amount of capital, brain, and hand work involved The bicycle tire department suffered on account of conditions in the bicycle industry. On the other hand, the technical department was well occupied. Ground was gained both at home and abroad in the trade in automobile tires. Modernization and extension of the power-supply plant is also going on apace, and it is planned to complete extensions which will enable the firm to provide all of its own power. The Excelsior works are expanding the reclaim department and bringing it up to date.

Complaint was made of the excessively high rates and taxes which have increased over seventeen-fold since 1913. In fact, these imposts are by far the most important factor in the cost item. Profits, after deducting general expenses, wages, salaries, bonuses, and the carry-forward amounted to 20,110,991.26 marks. Taxes and imposts totaled 12,722,545.02 marks, and after deducting this sum and writing off various items, a net profit of 3,073,722 marks was retained. Of this, 5 per cent was distributed as dividends on the preferential shares, 7 per cent on the original shares, and 458,722 marks were carried forward.

A block of shares representing 23 per cent of the share capital which had been held by the Goodrich company, has been bought back. This purchase will in no way affect the relations existing between the German and the American firms in regard to the exchange of experience both technical and chemical in the whole rubber industry.

The outlook for the coming year is uncertain. The end of 1928 was marked by a falling off in business and the early months of 1929 have proved unsatisfactory, largely due to the severe weather conditions, however.

According to the latest reports, final negotiations for a fusion between the Continental Caoutchouc-und-Gutta Percha Compagnie, Hannover, and the Peters Union A. G., Frankfort a. Main, have just been concluded. Peters Union will propose at its next meeting to transfer the property of the concern to the Continental concern. In exchange for 9,000,000 marks shares of the Peters Union, 6,750,000 marks of shares of the Continental will be guaranteed. The exchange of the 160,000 marks preferential shares of Peters Union will take place on the same basis. It does not seem likely that Continental will increase its capital to carry through the fusion.

FRANCE

Net imports of crude rubber, balata, and gutta percha into France in 1928 came to 518,864 quintals, value 327,117,000 francs. The value of the manufactured goods of rubber entering the country in that year was 149,378,000 francs, while exports of rubber goods totaled 629,876,000 francs. Of the goods imported, about one-third came from England, a little over one-fourth came from the United States, while Belgium supplied just under one-fourth.

The best customer for French goods, judging from the statistics, was Switzerland; next came Belgium; while oddly enough Algeria ranked a good third. Shipments to England and Spain followed in the order mentioned. Indo-China, Brazil, and Argentina took fair quantities of French merchandise, all things considered.

Among the imports may be mentioned: tires of all kinds, 17,995 quintals, value 45,260,000 francs; footwear, 3,800 quintals, value 11,441,000 francs; insulated cables and wires, 16,054 quintals, value 13,974,000 francs.

Of the exports, tires and tubes are, of course, the most important; therefore it is worth noting that there was a fairly marked falling off in shipments of these goods from France, the figures being: 1928, 224,939 quintals, value 597,201,000 francs, compared with 271,235 quintals, value 809,435,000 francs in 1927. The decrease seems to be mainly due to smaller quantities sent to England, the 1928 total having been 13,462 quintals, against 44,249 quintals in 1927, plainly a result of the special 33⅓ per cent duty that England has imposed on foreign tires.

The Swiss purchases of French tires also decreased to a notable extent, from 35,379 quintals in 1927 to 24,279 quintals in 1928.

The business in footwear was somewhat better in 1928, the comparative figures being given as 35,026 quintals, value 53,575,000 francs, against 33,122 quintals, value 52,154,000 francs. There was also an increase in trade in belting, hose, and packing, 30,832 quintals, value 53,566,000 francs, against 25,442 quintals, value 48,100,000 francs; as well as in rubberized and elastic fabrics and articles thereof, 11,471 quintals, value 49,538,000 francs, instead of 8,482 quintals, value 37,194,000 francs.

The Rubber Industry in the Far East

MALAYA

Production and Values of Restricted Rubber

The annual report of the Controller of Rubber, Malaya, for the sixth and last restriction year contains some interesting facts and figures. The total standard production of the Malayan restriction area during the period November 1, 1927 to October 31, 1928, was 314,085 tons, the proportion for the individual sections being as follows: Federated Malay States, 173,857 tons; Straits Settlements, 33,913 tons; Johore, 68,473 tons; Kedah, 26,875 tons; Kelantan, 8,382 tons; and Trengganu, (estimated) 2,585 tons. This was a reduction of 22,910 tons, as compared with the standard production for the fifth year. The new rules regarding assessments in the sixth year gave rise to considerable dissatisfaction and there were altogether 252 appeals against assessments. Of this number 120 were allowed, 71 were dismissed, and 61 canceled.

The declared values per ton of rubber during the first half of each of the years 1922 to 1927 inclusive were as follows: First half of 1922 (prerestriction), $575; 1923, $1,175; 1924, $975; 1925, $1,469; 1926, $2,192; 1927, $1,529. During November, 1927 to February 9, 1928, the declared value per ton was $1,560; during February 9, 1928 to April 4, 1928, $1,005; and during April, 1928 to October 31, 1928, $692.

Collecting Statistics

When the decision to abolish restriction was made known, the Advisory Committee was anxious that the valuable statistics and data collected under restriction should not be lost or allowed to become out of date. The matter was very carefully discussed in the Committee, and the government finally accepted a scheme put forward by the Controller of Rubber and the Advisory Committee, and Gordon Carrie was appointed Deputy Supervisor of Rubber for the purpose of collecting and preparing rubber statistics. It was agreed to try the program out for at least six months and that before any further decision was made, five members of the Advisory Committee would be given an opportunity of examining the work done and expressing their views on the subject to the government for final consideration.

Exports and Prices

Exports from the Malayan restriction area at the minimum rate of duty were 197,599 tons during the sixth restriction year, as compared with 243,250 tons for the fifth year and 278,228 tons for the fourth year. During the last restriction year the highest price was 72¾ cents in November, 1927, while the lowest was 27¼ cents in April, 1928.

Rubber Smuggling

Owing to the lower prices prevailing in 1928, there was less incentive to smuggle and the diminished activity in this direction is reflected in the details of the operations of the preventive fleet. It will be remembered that nine preventive launches were in commission until the beginning of May, 1928 when one was withdrawn, and the rest were withdrawn at intervals, the last one on October 31, 1928. During 1927, the preventive fleet seized 277 boats and 5,699.465 piculs of rubber; 508 persons were convicted; and $2,559,085.87 in fines were imposed. In 1928 (to October 31), 59 boats were seized and 2,365.8575 piculs of rubber, while 257 persons were convicted, and $534,557.60 was imposed in fines.

Connemara United, Ltd.

The news has just been received that four important Malaya concerns are seriously considering proposals for amalgamation. The companies involved are the Allenby Rubber Co., Ltd., the Balgownie Rubber Estates, Ltd., Connemara, Ltd., and the Kundong Rubber Estate, Ltd. The new company, if formed, will be known as the Connemara United, Ltd., and the first directors will be Eric Macfadyen, R. C. M. Kindersley, and C. Ritchie.

The new company, which would be formed in London, would acquire the undertakings of the four firms concerned as from January, 1929. The valuations of the estates, based on estimated crops for the seven years, 1929 to 1935, and on an arbitrary selling price of 50 cents per pound, work out as follows, after necessary adjustments and allowances have been made: Allenby, $1,289,981; Balgownie, $1,108,758; Connemara, $1,140,057; Kundong, $1,007,144; making a total of $4,545,940. To capitalize the new undertaking on a conservative basis it was unanimously decided by the directors of the four companies to scale down the total valuation to $1,800,584, which is about $325 per acre planted, and that the liquid assets, over liabilities, of each company as of December 31, should be added to the scaled-down total.

It is estimated that after defraying the costs of amalgamation and the liquidation of the old companies, the new company will have cash and liquid working capital amounting to £32,000, or after making provision for bringing the immature areas into bearing and the cost of the other necessary capital expenditure, £11,000, to which must be added the profits earned by the old companies for the period from January 1 to the completion of the amalgamation.

The combined area of the new company will be 6,560 acres, of which 5,534 acres are planted. The planted area includes 1,000 acres of immature rubber on Balgownie and Connemara, which give prospects of excellent yields as they are planted with selected materials and part of the trees have been budgrafted from approved clones.

Wilkinson Process Rubber Co.

Concerns that have undertaken the manufacture of rubber in Malaya have on the whole not been conspicuously successful. An enterprise, the progress of which has been watched with a good deal of interest, is the Wilkinson Process Rubber Co., whose products, including in particular rubber liners for mining machinery, have attracted favorable notice in different parts of the world. This company booked a loss on the working for the year ended September, 1927, and again for the year ended 1928. The net loss for last year was $84,493.65 to which has to be added the loss carried forward from the year before amounting to $54,458.47.

The report states that the increase in output was not so great as had been expected because of difficulties in connection with the standardization of certain products which made it inadvisable to produce to full capacity. These difficulties have since been overcome. The company was also unfortunate enough to have large stocks on hand when the price of rubber suddenly dropped last year, and this added to the extra costs involved by the difficulties mentioned before, was responsible for the adverse balance.

During the year, patent rights have been granted to Holland and her colonies, which includes the Netherlands East Indies. Two more patents have been taken out in the Federated Malay States covering a new process and important manufacturing improvement.

Malayan Rubber Stocks

It is officially announced that the result of the rubber census at the end of February, 1929 was as follows:

1. Estimated dry weight of rubber of all grades on estates of over 100 acres: Federated Malay States, 15,835 tons; Straits Settlements (excluding Singapore and Penang), 2,602 tons; Johore 5,324 tons.

2. Stocks of prepared rubber ready for

sale on the same estates: Federated Malay States, 11,771 tons; Straits Settlements (excluding Singapore and Penang), 2,086 tons; Johore, not available.

3. Production declared on the same estates during the month: Federated Malay States, 10,101 tons; Straits Settlements (excluding Singapore and Penang), 1,508 tons; Johore, 2,804 tons.

4. Stocks held by dealers: Federated Malay States, 11,841 tons; Straits Settlements (excluding Singapore and Penang), 1,749 tons; Johore, 2,538 tons.

Dealers' stocks: Singapore and Penang —smoked sheet and crepe, 24,946 tons; other grades, 7,427 tons; total, 32,373 tons.

Exports during February: Federated Malay States, 23,332 tons; Johore, 9,442 tons; Kelantan, 887 tons; other areas, not available; total 33,661 tons.

Growers Buy More Fertilizers

A higher price-range for raw rubber and a free market are apparently spurring growers to get the utmost latex yield from their estates. According to U. S. Commerce Reports, better prices for rubber have of late brought about a marked increase in demand for fertilizers for many plantations in British Malaya.

NETHERLANDS EAST INDIES

Rubber Diseases

The Rubber Experiment Station in collaboration with other experiment stations in Java and the Advisory Service for South Sumatra has compiled a review of the pests and diseases of *Hevea Brasiliensis* in 1928.

In root diseases, the red root mold, *Ganoderma pseudoferreum,* caused most damage and was mostly met with in the older estates. Cases of white root mold, *Rigidoporus microporus,* were chiefly reported from East Java. Very few cases of brown root mold, *Fomes Lamaoensis,* occurred; while there were no serious attacks of *Ustulina Zonata.*

Brown bast continues to be one of the most important diseases, and on estates where daily tapping is still in use the damage may be considerable. The same is true on estates where no precautions against the disease are taken. Early detection of the diseased trees and treatment according to the Keuchenius method. or resorting to a shorter tapping cut, have proved to be the best methods of combatting the disease.

Stripe canker, *Phytophthora Baberi,* prevailed in more or less severe form all over Java; in South Sumatra, however, it seems to be of little importance. With preventive treatment the disease may be practically entirely avoided, but where no treatment is given or the wrong kind is resorted to, the evil effects of the disease are clearly visible on the tapping cut.

Moldy rot was observed only on a few very damp estates in West and Central Java. Treating the tapping cut with a tar solution prevents damage.

Sporadic cases of pink disease were reported practically all over, and in wetter districts may cause a fair amount of damage, so that it should be regularly attended to. The disease also attacks very young trees, as was found from samples submitted.

Leaf disease, *Helminthosporium,* is regularly met with in nurseries and young budded areas, and was reported from all districts. In some parts the attacks were severe and caused a stagnation in growth. The disease was also found on young plantations.

Mildew, *Oidium spec.,* caused more damage in West Java than during the previous year. Low-lying plantations, from where formerly only sporadic cases were reported, were fairly severely attacked during the year under review. This was also true for Central Java where attacks were also more severe than in the preceding year. East Java again suffered heavily. but while the disease was more severe on some estates, it was much less serious on others.

In South Sumatra sporadic cases of the disease were reported all over. Tests in spraying with sulphur powder from airplanes and from the ground clearly indicated that this method could control the disease.

Among the pests, mites were, of course, the most important, and serious attacks were reported from nurseries and young budded areas. In fact the result often was a cessation of growth. Spraying was the most effective method of controlling the pest.

1928 Rubber Exports

According to recently compiled statistics, the amount of crude dry rubber exported from the Netherlands East Indies in 1928, was 225,983 long tons. The total exports of estate rubber came to 137,561 long tons, of which 12,500 tons were sprayed rubber, and about 1,250 tons liquid latex. Java exported 58,900 tons of estate rubber, East Coast Sumatra, 64,005 long tons. and other districts, 14,656 long tons. If 12,993 tons of native rubber, dry weight, are added to East Coast Sumatra shipments, the total for this district comes to 76,998 long tons.

In spite of low prices during 1928, total exports of native rubber came to 88,422 long tons, due allowance (33⅓ per cent) having been made for moisture and impurities. This figure includes 18,000 tons of dry, locally remilled rubber, which seems to indicate that the Rubber Unie has overcome initial difficulties and is now making good headway. Details of exports follow:

NETHERLANDS E. I. EXPORTS

Estate Rubber	Java, Kilos.	E. C. Sumatra Kilos.	Others, Kilos.	Total, Kilos.
Liquid latex (wet)	(182,826)	(3,889,729)	(40,040)	(4,112,595)
31.56 per cent dry	57,700	1,227,599	12,637	1,297,936
Sprayed rubber	2,875,326	10,120.745	.....	12,996,071
Rubber in sheets	56,813,242	53,532,451	14,318,249	124,663,942
Other cultivated	72,485	98,606	389,834	560,925
Ficus rubber (wild)	27,021	53,286	170,130	250,437
Totals, dry	59,845,774	65,032,687	14,890,850	139,769,311
Long tons	58,900	64,005	14,656	137,561
Native Rubber				
Exported wet	.....	(17,752,005)	(92,059,635)	(109,811,640)
65 per cent dry	.....	11,538,803	59,838,763	71,377,566
Exported dry	.....	1,662,469	16,801,770	18,464,239
Totals, dry	.....	13,201,272	76,640,533	89,841,805
Long tons	.....	12,993	75,429	88,422
Grand total, dry: Kilos	59,845,774	78,233,959	91,531,383	229,611,116
Long tons	58,900	76,998	90,085	225,983

The destinations of estate and native rubber exports are shown separately in the following table, quantities being in dry weight. The figures indicate that most of the native rubber remilled in the Dutch colonies goes direct to consumers, very little going to Singapore.

EXPORTS—BY DESTINATIONS

	Estate Rubber, Long Tons	Native Rubber, Long Tons	Total, Long Tons
Malaya	7,410	77,266	84,676
United States	78,780	9,038	87,818
England	25,333	230	25,563
Netherlands	11,367	205	11,572
Other Europe	10,415	1,387	11,802
Japan	1,268	271	1,539
Australia	2,853	25	2,878
China	52	.....	52
Other countries	83	.....	83
Totals	137,561	88,422	225,983

JAPAN

Official figures regarding Japan's gross imports, reexports, and net imports of crude rubber and gutta percha during the last three years are given as shown in the tables below:

	1926 Long Tons	1927 Long Tons	1928 Long Tons
Gross imports	18,124	20,814	25,642
Reexports	475	102	21
Net imports	17,649	20,712	25,621

SOURCES OF GROSS IMPORTS

	1926 Long Tons	1927 Long Tons	1928 Long Tons
Malaya	12,420	13,441	18,310
India and Ceylon	5,304	6,857	5,802
Netherlands East Indies	97	347	1,094
Great Britain	6	77	142
Other countries	297	92	294
Totals	18,124	20,814	25,642

Rubber Patents, Trade Marks and Designs

Machinery Patents

United States

1,705,083.* AIRBAG. This invention covers an expansible airbag and applies to those used in curing tires either sectionally or the full circle. Its special feature is the construction of single or double inwardly projecting folds which on inflation will expand and exert pressure against the bead portion of the tire.—Wilbur B. Burke, East Cleveland, O.

1,705,265.* PRESSURE EQUALIZER. This is a device loosely attached to the inner side of the cover of a tire vulcanizing press. It functions to compensate for misalinement of the ram platen on which the molds rest and the cover of the vulcanizer, thus equalizing the pressure on all the molds in the stock under pressure.—Albert Otto, assignor to Morgan & Wright, both of Detroit, Mich.

1,706,384.* TENNIS BALL MACHINE. The feature of this machine is a pair of hemispherical cups, revolvable in axial alinement in a suitable frame. One at least of the cups is axially movable. The ball receives one of the cemented two-part cover pieces from a sliding block. This piece is the only one applied by the device, the second or complementary piece being adjusted by hand.—Fred W. Gesalman, Greensburg, assignor to Pennsylvania Rubber Co., Jeannette, both in Pa.

1,706,605.* HOSE WRAPPING DEVICE. The feature of this invention is a block or sectional table revolvably mounted on a floor stand. A hose coiled on the table can be helically bound by passage of a cord or tape between the circle of blocks. Its coils are thus securely held and the hose can be subsequently inserted in a wrapping machine for paper covering.—Jorgen I. Haase, assignor to The Goodyear Tire & Rubber Co., both of Akron, O.

*Pictured in group illustration.

1,706,615.* TUBE DEFLATING MACHINE. This relates to a machine which deflates a number of tubes simultaneously. It is operated from a source of power and is provided with means whereby it is only necessary to place the inflated tube upon the machine to secure its deflation automatically.—Raphael S. Kirk, assignor to The Goodyear Tire & Rubber Co., both of Akron, O.

1,706,626.* BAND BUILDING MACHINE. This invention provides a machine which may be advantageously employed in stitching or uniting the ends of a number of superimposed plies to form an endless band.—Elov F. Maas, assignor to The Goodyear Tire & Rubber Co., both of Akron, O.

1,706,679.* TUBE DEFLATING MACHINE. This provides an apparatus by means of which the tubes may be rapidly deflated to the desired extent after testing. It is arranged to enable economical and efficient manipulation by the operatives, ready inspection of the tubes, and the complete drying of the tubes while on the machine.—Albert G. Smith, assignor to The Miller Rubber Co., both of Akron, O.

1,707,620.* INNER TUBE VULCANIZER. This mechanism is adjustable to different sizes of molds without necessitating a complete change of equipment.—O. J. Kuhlke, assignor, by mesne assignments, to National Rubber Machinery Co., both of Akron, O.

1,707,640. TUBE STRIPPING APPARATUS. This stripping device enables a single operative to perform the stripping operation without the use of plugged mandrels.—Max H. Pade, assignor to The Firestone Tire & Rubber Co., both of Akron, O.

1,707,646.* AIRBAG INSERTING MACHINE. An apparatus is provided for folding an airbag in substantially circular form to reduce its diameter to approximately the bead diameter of a tire casing in order that the bag may be easily inserted therein.—William C. Stevens, assignor to The Firestone Tire & Rubber Co., both of Akron, O.

1,707,794.* TUBE SPLICING MANDREL. A mandrel is heated to uniform temperature by steam circulation, the steam inlet and outlet being mounted close together at the periphery of one end of the mandrel. Provision is made for the removal of the water of condensation.—Ernest Blaker, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.

1,705,219. TIRE BUILDING MACHINE. R. E. Jenkinson, assignor to The Goodyear Tire & Rubber Co., both of Akron, O.

1,706,697 and 1,706,698. TREAD APPLYING MECHANISMS. P. W. Lehman, Milwaukee, Wis., assignor to The Fisk Rubber Co., Chicopee Falls, Mass.

1,707,047. FLEXIBLE MATERIAL WINDER. J. A. Cameron, assignor to Cameron Machine Co., both of Brooklyn, N. Y.

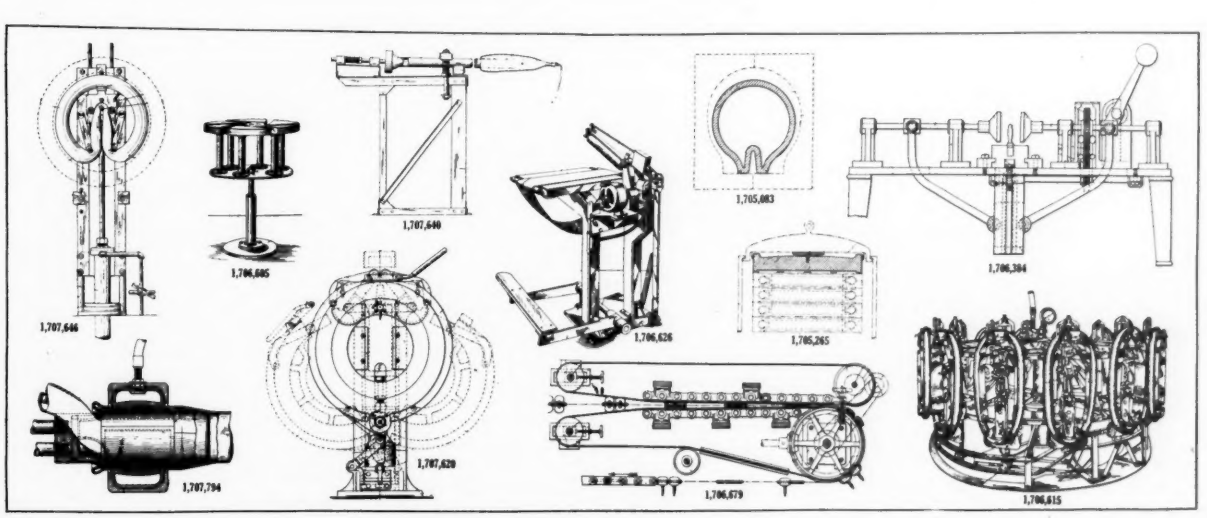
1,707,130. TIRE TUBE TESTER. P. Milner, Crowley, La.

Dominion of Canada

287,727. BOOT MOLD. The Hood Rubber Co., assignee of A. A. Glidden, both of Watertown, H. G. Ellis, Waltham, and H. L. Davis, Walpole, all in Mass., U. S. A.

287,752. TIRE RETREADING MOLD. The Super Mold Corp., Reno, Nev., assignee of The Super Mold Co., Lodi, Calif., assignee of F. L. Smith, J. S. Canfield and C. J. Peterson, Sacramento, Calif., all in the U. S. A.

287,785. TIRE INFLATING APPARATUS. A. A. T. Creser, Richmond, Surrey, and G. B. Baker, Leeds, Yorkshire, co-inventors, both in England.



Rubber Patents, Trade Marks and Designs

287,881. CEMENTING MACHINE. The Dominion Rubber Co., Ltd., Montreal, Quebec, assignee of H. F. Lewis, Hamden, Conn., U. S. A.

287,994. SOLE ATTACHING APPARATUS. A. S. Gent, Northampton, England.

288,020. TIRE VULCANIZER. C. E. Norris, London, Ontario.

288,085. THREAD WINDING MACHINE. The India Rubber, Gutta Percha & Telegraph Works Co., Ltd., London, E. C. 4, assignee of G. E. Turpin, London, E. 16, both in England.

288,265. LIQUID CIRCULATION APPARATUS. The Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of R. F. McKay, H. Willshaw, W. G. Gorham and R. F. Lee, Birmingham, all in England.

288,268. TIRE REPAIRING APPARATUS. The Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of H. Willshaw and T. Norcross, Birmingham, Co. of Warwick, all in England.

288,293. VULCANIZER. The Liverpool Rubber Co., Ltd., assignee of F. Amende and E. D. Griffiths, all of Liverpool, Co. of Lancashire, England.

United Kingdom

303,609. CORE COVERING DEVICE. Dunlop Rubber Co. Ltd., H. Willshaw and J. W. Malthouse, Fort Dunlop, Birmingham.

303,612. CORD CLOTH APPARATUS. F. D. Smith, 805 Cormorant St., Victoria, B. C., Canada.

303,718. BELT STRETCHING DEVICE. C. Macintosh & Co., Ltd., and H. C. Young, 2 Cambridge St., Manchester.

303,918. TIRE VULCANIZER. J. Lenegan, 47 Hodson St., Wigan.

304,029. ELECTROLYSIS. Dunlop Rubber Co., Ltd., 32 Osnaburgh St., London, and H. Trevaskis of Dunlop Rubber Co., Coventry.

304,686† CONCENTRATING LATEX. Aktiebolaget Separator, 8 Fleminggatan, Stockholm.

304,810. BALL PAINTING APPARATUS. Dunlop Rubber Co., Ltd., 32 Osnaburgh St., London, H. Willshaw and T. Cropper, Fort Dunlop, Birmingham.

Germany

473,816. FORMING AND VULCANIZING TIRES. The Dunlop Rubber Co., Ltd., London. Represented by Dr. R. Wirth, C. Weihe, Dr. H. Weil, M. M. Wirth, Frankfurt a. Main, and T. R. Koehnhorn and E. Noll, Berlin S. W. 11.

473,934. RUBBER WARP MACHINE. Theodor Vorck and Paul Zimmermann, Grafenstrasse 9-11, Barmen-Wichlinghausen.

Designs

1,064,757. JOINING INNER TUBES. Continental Caoutchouc und Gutta-Percha-Compagnie, Hannover.

Process

United States

1,706,126. BOOTS AND SHOES. R. W. Peer, E. Orange, N. J., and P. A. Sawyer, New York, N. Y.

1,707,014. TIRE. E. Hopkinson, New York, N. Y.

1,707,585. MOLDING. C. E. Turrell, Lakewood, assignor to The Monobloc Co., Dover, both in O.

1,707,956. ELASTIC WOVEN FABRIC. T. F. Moore, assignor to Geo. C. Moore Co., both of Westerly, R. I.

Dominion of Canada

287,725. LINING FOR BOOTS. The Hood Rubber Co., assignee of A. A. Glidden, both of Watertown, and F. R. McKenzie, Brighton, all in Mass., U. S. A.

287,735. DECORATIVE TREATMENT OF FABRICS. J. Mandleberg & Co., Ltd., assignee of J. Lloyd, both of Manchester, England.

287,766. BALL. Dr. Dorogi ét Társa Gummigyár R.-T., Budapest-Albertfalva, assignee of half the interest of I. and L. Dorogi, both of Budapest, all in Hungary.

288,064. TUBE MANUFACTURE. The Cupples Co., St. Louis, assignee of J. A. Fleischli, Clayton, both in Mo., U. S. A.

288,266. RUBBER MANUFACTURE. The Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of D. F. Twiss and E. A. Murphy, Birmingham, Co. of Warwick, all in England.

United Kingdom

303,895† TREATING LATEX. Aktiebolaget Separator, 8 Fleminggatan, Stockholm.

304,633. MOLDING INDIARUBBER. J. Townley, 222 St. Margaret's Rd., Ward End, Birmingham.

Chemical Patents

United States

1,705,264. COLORED POLYMERIZED STYROL AND ITS HOMOLOGS AND PRODUCTS OBTAINED THEREBY. Iwan Ostromislensky, New York, N. Y., assignor to The Naugatuck Chemical Co., Naugatuck, Conn.

1,705,273. RUBBER SURFACING ON A RIGID BASE. Merwyn C. Teague, Jackson Heights, N. Y., assignor to The Naugatuck Chemical Co., Naugatuck, Conn.

1,705,537. SATURATING PAPER. Reed P. Rose, Jackson Heights, and Harold E. Cude, Floral Park, assignors to General Rubber Co., New York, all in N. Y.

1,705,712. COMPOUND FOR TREATING RUBBER. E. R. Bridgwater, Wilmington, Del., and A. S. Slack, Brooklyn, N. Y., assignors to E. I. du Pont de Nemours & Co., Wilmington, Del.

1,705,757. HEAT PLASTIC DERIVATIVE OF RUBBER. A composition of matter comprising the high-temperature reaction product of an intimate mixture of rubber and pine tar with an isomerizing agent for rubber.—W. C. Geer and H. A. Winkelmann, Akron, O., assignors to The B. F. Goodrich Co., New York, N. Y.

1,705,948. ACCELERATOR. M. L. Weiss, Newark, N. J., assignor to Dovan Chemical Corp., New York, N. Y.

1,706,294. AIRCRAFT COVERING. A fabric treated with a compound consisting of a mixture of regenerated cellulose and rubber redispersed in organic solvents.—I. M. Jacobsohn, Chicago, Ill., and Starr Truscott, Birmingham, O.

Dominion of Canada

287,593. SOLE. Leon B. Conant, Cambridge, Mass., U. S. A.

287,650. ACCELERATOR. Winfield Scott, Nitro, W. Va., U. S. A.

287,701. RECLAIMING AND DISPERSING METHOD. A process of reclaiming vulcanized rubber in a form capable of dispersion in water without the addition of a dispersing agent, comprises digesting under elevated temperature and pressure the vulcanized rubber together with alkali, a softener and resin oil, whereby a plastic mass is produced comprising a soap formed *in situ* therein sufficient to permit dispersion of the mass in water by manipulation in the presence of water.—The Dispersions Process, Inc., Dover, Del., assignee of T. G. Richards, Cambridge, and G. P. F. Smith, Newton, both in Mass., all in the U. S. A.

287,705. WIRE COVERING METHOD. The Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of D. F. Twiss and E. A. Murphy, both of Birmingham, all in England.

288,262. COATING COMPOSITION. Dominion Rubber Co., Ltd., Montreal, Canada, assignee of S. I. Strickhouser, Jackson Heights, N. Y., U. S. A.

288,264. RUBBER SURFACE PROCESSING. Method of reducing the tackiness of unvulcanized rubber surfaces by treating them with a material which is decomposable at vulcanizing temperatures into a volatile portion and a rubber soluble portion.—Dominion Rubber Co., Ltd., Montreal, Canada, assignee of W. A. Gibbons, Great Neck, L. I., N. Y., U. S. A.

288,267. ORGANIC MATERIAL DEPOSITION. A process of preparing rubber for deposition by electrophoretic means.—Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of R. F. McKay and W. H. Chapman, Birmingham, all in England.

United Kingdom

303,368†. COATED FABRICS. E. I. du Pont de Nemours & Co., Wilmington, Del., assignees of W. S. Gocher, Fairfield, Conn., and A. N. Parrett, Wilmington, Del., all in the U. S. A.

303,400. ATTACHING RUBBER TO ARTICLES. L. P. F. F. Cresson, 95 Anna Paulownastraat, 's—Gravenhage, Holland.

303,451†. PLASTIC FILLERS FOR BOOTS AND SHOES. I. G. Farbenindustrie A. G., Frankfort-on-Main, Germany.

303,535. ACCELERATOR. Imperial Chemical Industries, Ltd., Westminster, W. J. S. Naunton and J. B. Payman, both in Blackley, Manchester.

† Not yet accepted.

303,544. Removal of Water from Rubber Articles. Dunlop Rubber Co., Ltd., 32 Osnaburgh St., London, E. A. Murphy and D. F. Twiss, both of Fort Dunlop, Birmingham.

303,545. Transparent Vulcanized Rubber. Dunlop Rubber Co., Ltd., 32 Osnaburgh St., London, D. F. Twiss and E. A. Murphy, both of Fort Dunlop, Birmingham.

303,546. Molding Latex by Dipping. Dunlop Rubber Co., Ltd., 32 Osnaburgh St., London, D. F. Twiss and E. A. Murphy, both of Fort Dunlop, Birmingham.

303,564. Electric Deposition of Rubber. Imperial Chemical Industries, Ltd., Westminster, A. J. Hailwood, W. J. S. Naunton, and A. Shepherdson, all of Blackley, Manchester.

303,765. Depositing Rubber. Dunlop Rubber Co., Ltd., 32 Osnaburgh St., London, and W. H. Paull, Fort Dunlop, Birmingham.

303,814. Coloring and Ornamenting Ebonite. British Hard Rubber Co., Ltd., and P. E. Wells, Ponders End, Middlesex, Eng.

303,827†. Antioxidants. Compounds specified are the reaction products of mercaptothiazoles with nitro compounds. Goodyear Tire & Rubber Co., assignees of J. Teppema, Twin Oaks, both of Akron, O., U. S. A.

303,868†. Wire Insulation. International General Electric Co., Inc., 120 Broadway, New York, N. Y., U. S. A., assignees of Allgemeine Elektricitäts-Ges., 2, Friedrich Karl-Ufer, Berlin, Germany.

304,157. Rubber Coating Fabrics. Anode Rubber Co., (England) Ltd., 110 Bishopsgate, London.

304,207†. Synthetic Rubber. I. G. Farbenindustrie, A. G., Frankfort-on-Main, Germany.

304,334. Paint for Rubber Surfaces. P. Schidrowitz, 57 Chancery Lane, and D. J. Burke, 4 Swan Walk, both in London.

304,376. Coloring Rubber. Imperial Chemical Industries, Ltd., Broadway Buildings, Westminster, A. J. Hailwood, W. J. S. Naunton, and A. Shepherdson, all of Blackley, Manchester.

304,437. Connecting Uppers to Soles. W. G. Rudolph, 4 Friedenstrasse, Hanover, Germany.

304,612† Synthetic Rubber. I. G. Farbenindustrie, A. G., Frankfort-on-Main, Germany.

304,823. Plastic Composition. British United Shoe Machinery Co., Ltd., F. Ricks, and R. A. Lineham, all of Belgrave Road, Leicester.

Germany

474,624. Producing Plastic Masses. Electrical Research Products, Inc., New York, N. Y., U. S. A. Represented by B. Kugelmann, Berlin S. W. 11.

Prints

United States

11,672. Collette Demountable Cushion Tire. Tires. Collette Cushion Tire Co., Manitowoc, Wis. Published Jan. 25, 1929.

†Not yet accepted.

Rubber Patents, Trade Marks and Designs

General

United States

March 12, 1929*

1,704,764. Colonic Exploration Apparatus. O. B. Schellberg, New York, N. Y.

1,704,768. Vehicle Safety Device. M. Sigman, assignor of forty-nine one hundredths to V. Congemi, both of Cleveland, O.

1,704,927. Garment Supporter. E. A. Taylor, Buffalo, N. Y.

1,704,960. Massage Applicator. D. M. Ackerman, Long Beach, Calif.

1,704,975. Life Belt. J. F. Kennedy, Baltimore, Md.

1,704,997 and 1,704,998. Weather Strip. A. H. Atzenhoffer, Chicago, Ill.

1,705,004. Razor Wiper and Lather Receptacle. O. Dick, Waco, Tex.

1,705,215. Rubber Heel Holder. K. H. Anderson, Chicago, Ill.

1,705,365. Tire Valve Lock. W. J. Hurst, Maqucketa, Ia.

1,705,454. Gasket. R. T. Griffiths, assignor to The Miller Rubber Co., both of Akron, O.

1,705,455. Packing Gasket. R. T. Griffiths, assignor to The Miller Rubber Co., both of Akron, O.

March 19, 1929*

1,705,473. Necktie. B. Gold, New York, N. Y.

1,705,566. Packing. B. P. Hoffman, assignor to The Pierce Development Co., both of Tulsa, Okla.

1,705,597. Cushion Heel. C. Turner, Beverly, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

1,705,771. Diaphragm. I. Kimball, Brookline, assignor to Globe Technolian Corp., Boston, both in Mass.

1,705,800. Pump Valve. S. M. Akeyson, Long Beach, Calif.

1,705,949. Insulated Cable. R. R. Williams, Roselle, N. J., assignor to Western Electric Co., Inc., New York, N. Y.

1,706,053. Window Wiper. E. M. Bussinger, Chicago, Ill.

1,706,153. Electric Insulator. I. F. Giles, Yonkers, assignor to Ileite Electric Mfg. Corp., Tuckahoe, both in N. Y.

1,706,367. Splice. C. P. Tolman, New York, N. Y., assignor to Allis-Chalmers Mfg. Co., Milwaukee, Wis.

March 26, 1929*

1,706,408. Paste Brush. G. E. Miller, Boston, assignor to The Carter's Ink Co., Cambridge, both in Mass.

1,706,508. Garter. W. N. Winnett, assignor to The Currie Mfg. Co., Ltd., both of Toronto, Ont., Canada.

1,706,560. Air Cushion. O. B. Carlson, Oak Park, Ill.

*Under Rule No. 167 of the United States Patent Office, the issue closes weekly on Thursday, and the patents of that issue bear date as of the fourth Tuesday thereafter.

1,706,855. Inflation Valve. E. L. Larson and C. A. Braunger, Oconomowoc, Wis.

1,706,978. Swimming Device. V. Klodnyckyj, Chicago, Ill.

1,707,045. Toy Gun. R. J. Blackman, Stover, Mo.

1,707,104. Tire. J. Walker, Canonsburg, Pa.

1,707,213 and 1,707,214. Joint. H. C. Lord, Erie, Pa.

April 2, 1929*

1,707,374. Loom Whip Roll. R. G. Turner, assignor to Crompton & Knowles Loom Works, both of Worcester, Mass.

1,707,390. Self-Closing Shoe. C. Ferrettie, assignor to Mishawaka Rubber & Woolen Mfg. Co., both of Mishawaka, Ind.

1,707,480. Slippers. W. H. Jenks, Winchester, assignor to L. C. Chase & Co., Boston, both in Mass.

1,707,508. Pneumatic Tire Inflator. H. A. Case, Los Angeles, Calif.

1,707,525. Arch Support. T. E. King, Springfield, Mass.

1,707,700. Reenforced Electric Cable. H. Wodtke, Buffalo, assignor, by mesne assignments, to General Cable Corp., New York, both in N. Y.

1,707,714. Balloon. A. Dvilnsky, Brockton, Mass.

1,707,808. Electric Conductor. P. Jordan, Berlin-Steglitz, Germany.

1,707,815. Cushion Tire. A. A. Robb, Cuyahoga Falls, O., assignor to The B. F. Goodrich Co., New York, N. Y.

1,707,840. Tire Valve Stem. F. W. Benton, Wilson, N. C.

Dominion of Canada

March 5, 1929

287,616. Lamp Support. F. Helling, Hoboken, N. J., U. S. A.

287,716. Gaiter. The Firestone Footwear Co., assignee of P. H. Brown, both of Hudson, Mass., U. S. A.

287,726. Sole. The Hood Rubber Co., assignee of A. A. Glidden and T. M. Knowland, all of Watertown, Mass., U. S. A.

287,738. Abrasive Wheel. The Geo. W. Perks Co., assignee of J. R. Gammeter, both of Akron, O., U. S. A.

March 12, 1929

287,816. Handle Grip. E. Fetter, Baltimore, Md., U. S. A.

March 19, 1929

287,955. Electrical Connecting Lead. W. Haddon, London, S. E. 23, J. M. Burnett, Weston-by-Welland, County of Northampton, and J. A. Fullilove, Market Harborough, County of Leicester, co-inventors, all in England.

287,981. Air Pressure Indicator. R. Courchesne, Montreal, Quebec.

288,023. Bathing Cap. H. W. Patterson, Walkerville, Ontario.

Rubber Patents, Trade Marks and Designs

288,042. Bottle Sealing Device. A. C. Watson, Toronto, Ontario.

March 26, 1929

288,212. Bunion Reducer and Protector. W. M. Scholl, Chicago, Ill., U. S. A.

288,261. Fastener. The Dominion Rubber Co., Ltd., Montreal, Quebec, assignee of W. L. Pipes, Elizabeth, N. J., U. S. A.

288,263. Gaiter. The Dominion Rubber Co., Ltd., Montreal, Quebec, assignee of H. C. Porr, New York, N. Y., U. S. A.

United Kingdom

February 27, 1929

303,309. Sign. F. Hindsgaul, 6 Chr. IX's Gade, Copenhagen.

303,345† Windscreen Cleaner. Trico Products Corp., 624 Ellicott St., assignee of H. Hueber, 250 Southampton St., both of Buffalo, N. Y., U. S. A.

303,477† Pontoon. K. R. Blomquist, 1A Adolf Fredriks Torg, Stockholm, assignee of C. G. Fridholm, Bellmansro, both in Sweden.

303,536. Tire Inflating. A. A. T. Creser, 3 Manor Park, Richmond, Surrey, and G. B. Baker, 22 Methley Mount, Chapel Allerton, Leeds.

303,593. Hot Water Bottle. Campbell, Achnach & Co., Ltd., and D. C. Campbell, 59 Wallace St., Glasgow.

303,615. Bearing. C. R. Little, La Zaine Zer, Southleigh Ave., Styvechale, Coventry.

303,658. Flushing Apparatus. J. Shaw, 158 London Rd., Blackburn.

March 6, 1929

303,721. Boot. J. L. G. Dykes, 424 Aldine Ave., and S. R. Pruyn, 39 Board of Trade, both in Chicago, Ill., U. S. A.

303,757† Endless-Track Vehicle. E. S. Savage, 215 Dartmouth St., Rochester, N. Y., U. S. A.

303,777. Brake. A. G. Barrett and H. H. Burton, Evington Valley Mills, Leicester.

303,792† Resilient Connection. A. Losey, 16816 - 77th Rd., Flushing, and A. B. Clement, Bay Shore, both in N. Y., U. S. A.

303,887. Necktie. T. Rochman, 693 B'way, New York, N. Y., U. S. A.

303,912. Vehicle. S. A. Horst-Mann, Onega Lodge, and Horst-Mann, Ltd., James St., W., both in Bath.

303,919. Submarine Cable. W. E. Beatty, Bush House, Aldwych, London.—(Bell Telephone Laboratories, Inc., 463 West St., New York, N. Y., U. S. A.)

303,949. Vehicle Spring Suspension. G. H. Schieferstein, 1 Kaiser-Friedrich-Strasse, Charlottenburg, Berlin.

303,972. Railway Vehicle. A. Spencer, 2 Central Bldgs., Westminster.

303,974. Boot. Gradewell Last Co., Ltd., and H. Lack, Lancaster St., Leicester.

† Not yet accepted.

304,009. Pessary. H. Colquhoun, 86 Kennington Park Rd., London.

304,039. Tire. Dunlop Rubber Co., Ltd., 32 Osnaburgh St., London, F. Fellowes and F. A. Nicholas, Fort Dunlop, Birmingham.

304,061. Belt Conveyer. T. G. Nyborg and M. F. Higgins, Meco Works, Worcester.

304,080. Boot. L. Mellersh-Jackson, 28 Southampton Bldgs., London.—(Balloon Rubber Heel Corp., 100 South St., Boston, Mass., U. S. A.)

304,098. Spinning. J. Pflimlin, 7 Rue Gay-Lussac, Mulhouse, Haut-Rhin, France.

March 13, 1929

304,173. Detecting Submarine Sounds. C. P. Ryan and R. G. Hervey, H. M. S. Tarlair.

304,176. Detecting and Locating Submarine Sounds. C. P. Ryan, H. M. S. Tarlair.

304,177. Road Vehicle Signal. Powell & Hanmer, Ltd., Chester St., Birmingham, and W. J. Daniel, Woodside, Bracebridge Rd., Four Oaks, Warwickshire.

304,213† Respiratory Appliance. J. H. Monbeig, Salies-de-Béarn, Basses Pyrenées, France.

304,219. Tire. Dunlop Rubber Co., Ltd., 32 Osnaburgh St., London, F. Fellowes and F. A. Nicholas, Fort Dunlop, Birmingham.

304,286† Stocking Protector. A. Felix, 80 Faubourg St.-Denis, Paris.

304,288† Cement Pipe. B. E. Monteux, 122 Boulevard Murat, and P. L. Durand, 77 Rue de Prony, both in Paris.

304,373. Piston. English Electric Co., Ltd., 28 Kingsway and P. W. Seewer, 11 Wildwood Rd., Hampstead Garden Suburb, both in London.

304,405. Portable Writing Desk. A. J. Bartlett, The Rectory, Marston Magna, Somerset.

304,415. Quoit Game. J. G. Mitchell, Trench Hill House, Ringneal, Comber, Co. Down, Ireland.

304,433. Coating Fabric. N. Isherwood, Salop Street Works, Bolton.

March 20, 1929

304,490. Nut Cracking Machine. Richmond & Chandler, Ltd., and E. Mitchell, Southall St., Manchester.

304,499. Paving Block. E. C. Wallace, 55 Adella Ave., W., Newton, Mass., U. S. A.

304,512. Doll. E. G. K. Christensen, Ellidshöj, Aalborg, Denmark.

304,532. Well Drilling. J. Cuthill and Oil Well Engineering Co., Ltd., Cheadle Heath, Cheshire.

304,593† Endless Track Vehicle. R. Venzlaff, 29 Richthofenstrasse, W. Agahd, 5 Joachimsthalerstrasse, Charlottenburg, and O. Buck, 16 Straussbuergerstrasse, all in Berlin.

304,610† Flexible Coupling. Trinity Wheel Corp., 117 W. 46th St., New York, N. Y., U. S. A., assignee of F. W. Baker, High House, Oldswinford, Stourbridge, Worcestershire.

304,695† Motor Vehicle. Soc. Anon. Des Anciens Etablissements L. Laisne, Cote St. Sebastian, Nantes, Loire, France.

304,840. Mudguard for Shoes. P. G. Rouse, 6 Hurst Close, Bigwood Rd., London.

Germany

473,670. Arch Support Insole. Johannes Petrus Wijnman, Amsterdam, Holland. Represented by M. Mintz, Berlin W. 35.

473,909. Exerciser. Dr. W. Kampschulte A. G. Solingen.

474,014. Inner Tube. Wilhelm Rohrbeck, Residenzstrasse 33, Berlin-Reinickendorf-Ost.

474,257. Toy Vehicle. Ferdinand Sedlaczek, Danzig. Represented by H. Schmohl, Goppingen.

474,409. Tire with Fabric Insert. The Dunlop Rubber Co. Ltd., London. Represented by Dr. R. Wirth, C. Weihe, Dr. H. Weil, M. M. Wirth, Frankfurt a. Main, and T. R. Koehnhorn and E. Noll, Berlin, S. W. 11.

474,453. Collar Button. Max Richter, Jessen a. d. Elster.

474,496. Hair Brush. Burstenfabrik, Emil Kranzlein A. G. Erlangen.

Designs

1,062,689. Rubber Fabric Core. For use in manufacturing plaster and cement articles. Georg Abraham, Hauptstrasse 67, Berlin-Schoneberg.

1,062,704. Rubber - covered Handle. Gummi-Werke Elbe A. G., Klein Wittenberg a. d. Elbe.

1,063,389. Inflatable Body. The form of a rodent with a long tail. Gummiwarenfabrik bei Melle Wortmann & C. Bosch, Melle.

1,063,390. Inflatable Body. Gummiwarenfabrik bei Melle Wortmann & C. Bosch, Melle.

1,063,534. Sponge Rubber Brush. Firma C. R. Berger, Schonheide, Erzgeb.

1,063,574. Rubber Bag. Firma Ing. Hans Liewig, Dahlemerstrasse 29, Berlin-Lichterfelde.

1,063,816. Inner Tube. Firma E. Windelen, Bolkenhain i. Schl.

1,064,158. Glove. Gummiwerk Ernst Kniepert, Lobau i. S.

1,064,166. Tube. C. Vollrath & Sohn, Komm. - Ges., Bad Blankenberg, Thuringer Wald.

1,064,282. Ice Bag. Katheterreform Willy Rusch A. G., Cannstatt-Stuttgart.

1,064,284. Rupture Binder. Katheterreform Willy Rusch A. G., Cannstatt-Stuttgart.

1,064,376. Cover for Artificial Legs. K. Sunskes & A. Hohler, Corneliusstrasse 25, Dusseldorf.

1,064,494. Handkerchief Case. Magarethe Bier (née, Wolf), Dasselstrasse 61, Cologne.

1,064,534. Saddle for Bicycles and Motor Cycles. Continental Caoutchouc und - Gutta-Percha-Compagnie, Hannover.

1,064,571. Exchangeable Heel. Erich Prumers, Gustavstrasse 18, Altona a. d. E.

1,064,759. Conveyer Belt. Continental Caoutchouc - und Gutta - Percha - Compagnie, Hannover.

1,064,760. ANTI-SKID FOR TIRES. Firma August Hermann Haucke, Weissenfels a. d. S.

1,064,869. BLOW VALVE. Theodor Friedrichs, Turnerstrasse 29-33, Bielefeld.

1,064,897. DRIVING BELT. Continental Caoutchouc und-Gutta-Percha-Compagnie, Hannover.

1,064,898. MOLDED GAS MASK. Deutsche Gasgluhlicht-Auer-Gesellschaft, M. b. H., Rotherstrasse 16-19, Berlin O. 17.

1,064,926. HOSE. A. G. Metzeler & Co., Munich.

1,064,929. METAL COVER. Richard Kallmeyer & Co., Johannisstrasse 20, Berlin N. 24.

1,064,961. BATHING BAG. Jenny Magdalene von Kretschmann, Augustastrasse 13, Potsdam.

1,064,998. STOCKING. Elastik-Fabrik, Oststrasse 34, Barmen-Wichl.

1,064,999. PERFORATED RUBBER FABRIC. Elastik-Fabrik, Oststrasse 34, Barmen-Wichl.

1,065,201. APRON. Firma M. Steinberg, Maarweg 149, Cologne-Braunsfeld.

1,065,278. PNEUMATIC TIRE FELLOE. The India Rubber, Gutta Percha and Telegraph Works Co., Ltd., London. Represented by Meffert and Dr. Sell, Berlin S. W. 68.

1,065,364. COVER FOR DECORATIVE FIGURES. Albert Scharff, Altenbergen i. Th.

1,065,422. BATH MAT. Liga Gummiwerke A. G., Frankfurt-a-M.-Hausen.

1,065,674. ADJUSTABLE RUBBER SLIDE. Firma Her. J. Hellmers, Horner-Landstrasse 178-188, Hamburg 34.

1,065,892. REVOLVING HEEL. Carl Bausch, Schwetzingerstrasse 20, Mannheim.

1,065,928. HAIR CURLER. Firma Benjamin Cahn, Corneliusstrasse 8, Frankfurt a. Main.

1,065,963. ELASTIC GIRDLE. Hermine Hanni, (née, Schaffer), Stefanstrasse 21, Nurnberg.

1,066,014. BALL. Flugel & Polter, Leipzig-Plagwitz.

1,066,117. PNEUMATIC TIRE PROTECTOR. August Karl, Hallein, Austria. Represented by Eug. Kundt, Corneliusstrasse 16, Berlin-Lankwitz.

1,066,199. FLEXIBLE CONDUIT. Suddeutsche Kabelwerke, Abt. der Heddernheimer Kupferwerk und Suddeutsche Kabelwerke G. m. b. H., Mannheim.

1,066,673. PROTECTIVE COVER FOR TIRES. Paul Nickel, Mittelstrasse 80, Hamborn 6.

Designs

United States

77,960. FLOOR MAT. Term 3½ years. Harold W. Hollenbeck, Kirkland, assignor to Durable Mat Co., Seattle, both in Wash.

78,001. TIRE. Term 7 years. Leo Alter, assignor to The Harry Alter Co., both of Chicago, Ill.

78,022. INFLATABLE TOY. Term 3½ years. Frederick Hauff, assignor to The General Novelty Co., both of Akron, O.

Dominion of Canada

8,219. TIRE. The Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.

8,220. AUTOMOBILE TIRE TREAD. Gutta Percha & Rubber, Ltd., Toronto, Ont.

8,244. TIRE. The Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.

Rubber Patents, Trade Marks and Designs

Trade Marks

United States

Two Kinds of Trade Marks Now Being Registered

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section (1) (b) are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the later act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

March 12, 1929

Act of February 20, 1905

253,923. ULTREX—rectal and urethal hard-rubber syringes and rubber cots. William J. Guidon, doing business as Consumers Chemical Co., Minneapolis, Minn.

253,927. Representation of a crown formed by the word: "KINGLEY"—babies' nipples, pacifiers, and teething rings. Kingsley Novelty Co., Jamaica, N. Y.

254,024. VULCANOL—chemicals used in the manufacture of rubber which accelerate vulcanization. E. I. du Pont de Nemours & Co., Wilmington, Del.

254,048. TRIPODAL—shoes of leather, rubber, cloth, or any combination thereof. The Rosenbaum Co., Pittsburgh, Pa.

254,049. Representation of the bare sole of a foot on which is attached a triangular pennant containing the words: "TRIPODAL (horizontally) BALANCE" (vertically)—shoes of leather, rubber, cloth, or any combination thereof. The Rosenbaum Co., Pittsburgh, Pa.

254,070. DIP-SOL—rubber solvent. Anderson-Prichard Oil Corp., Oklahoma City, Okla.

254,071. RUB-SOL—rubber solvent. An- City, Okla.

254,078. Representation of a double crissderson-Prichard Oil Corp., Oklahoma cross effect at the sides of the underlined words: "BADGER TEX"—waterproof coats, capes, hats, suits, and ponchos. The Badger Raincoat Co., Port Washington, Wis.

254,083. VALSTAR — showerproof, rainproof, and waterproof coats. J. Mandleberg & Co., Ltd., Manchester, England.

254,201. THIONEX—chemicals used in the manufacture of rubber which accelerate vulcanization. E. I. du Pont de Nemours & Co., Wilmington, Del.

254,202. VULCONE—chemicals used in the manufacture of rubber which accelerate vulcanization. E. I. du Pont de Nemours & Co., Wilmington, Del.

254,203. VULCANEX—chemicals used in the manufacture of rubber which accelerate vulcanization. E. I. du Pont de Nemours & Co., Wilmington, Del.

254,204. NEOZONE—chemicals used in the manufacture of rubber to retard deterioration due to oxidation. E. I. du Pont de Nemours & Co., Wilmington, Del.

254,219. RUB-ER-JEL — rubber cement. Rub-Er-Jel Products, Inc., Needham, Mass.

Act of March 19, 1920

254,234. "RANE-SHEDDAR" — raincoats. Rane-Sheddar Mfg. Co., Dover, Del., and Pittsburgh, Pa.

254,235. STAPATCH—tire patch. Martin O. Haney, doing business as The Stapatch Tire Boot & Accessory Co., Iola, Kan.

March 19, 1929

Act of February 20, 1905

254,267. Representation of a man pointing to a star containing a crown and the letters: "L. P.", and above these representations the word: "DIC-A-DOO"—paint cleaner and preparation for cleaning painted, varnished, and enameled surfaces, tile, oilcloth, linoleum, ivory, marble, washable wall paper, cement, mosaic, rubber, and other substances not affected by water. The Patent Cereals Co., Geneva, N. Y.

March 26, 1929

Act of February 20, 1905

254,387. LADY LANE—shoes and boots of leather, rubber, or fabric, or of combinations of said materials. Lane Bryant, Inc., New York, N. Y.

254,419. Representation of a steering wheel of a boat containing the letter: "L," and below the wheel the word: "LEVIATHAN"—rubber heels. Sure Foot Heel & Rubber Co., Gettysburg, Pa., assignor to Victor Products Corp., Hagerstown, Md.

254,425. Representation of a bended bow and arrow containing the word: "ONEIDA"—shoes made of fabric and rubber. United States Rubber Co., New Brunswick, N. J.

254,426. Consists of the contrast of the colors green, yellow, and green in that order on the edges of the material, and is made to appear there by forming the goods out of three layers of material of those respective colors; representation of the edge of the material showing the three layers and representing their colors by lining them, the oblique lining in the first and third rows representing the green and the broken horizontal and vertical crossed lines in the center representing the yellow—tire patches. Fred J. Hagerling, St. Louis, Mo.

254,431. ROH-I-NOOR—combs. Hanover Rubber Co. "Excelsior" Inc., New York, N. Y.

254,493. LEO—shoes made of leather, canvas, rubber, and wood. Leo Harris, doing business as Advance Theatrical Shoe Co., Chicago, Ill.

254,533. BROWNIE—nipples for nursing bottles. Hygeia Nursing Bottle Co., Inc., Buffalo, N. Y.

254,547. MAMA—nursing bottles, nursing nipples, and parts for the same. Oshman Bros., New York, N. Y.

254,551. Representation of crossed medicine droppers with one of the letters: "PG P Co" in each angle, a pennant containing the word: "PERFECTION," and below the representation the words: "C-THAT BALL"—dropper stopper bottles, medicine droppers, and clinical thermometers. Tunis J. Dykema, doing business as Pennsylvania Glass Products Co., Pittsburgh, Pa.

Rubber Patents, Trade Marks and Designs

254,554. Representation of circle containing the letter: "A," and a dark border containing the words: "THE ANCHOR PACKING CO."—rubber belting and hose, machinery packing, brake lining, and clutch facing. The Anchor Packing Co., Philadelphia, Pa.

254,583. NORMAL TREAD ARCH—boots and shoes made wholly or in part of leather, rubber, fiber, or textile material. Paul C. Wolfer Co., Everett, Mass.

254,651. ELASTO—rubber heels and shoes made of leather, cloth, canvas, or combination thereof and having leather, rubber, or composition soles. Brown Shoe Co., Inc., St. Louis, Mo.

254,657. Representation of a diamond containing the word: "LANTICO"—rubber heels and soles. The Fairfield Rubber Co., Lancaster, O.

254,658. LANTICO—rubber heels and soles. The Fairfield Rubber Co., Lancaster, O.

254,659. The word: "BRADSTONE" above a representation of a circle containing the words: "QUALITY A+" —rubber heels. Bradstone Rubber Co., Woodbine, N. J.

April 2, 1929

Act of February 20, 1905

254,789. Representation of the letter: "R" with two dots in the upper loop—rubber garments, namely, gloves and aprons for household and similar use, baby pants, rompers, rain capes, and bathing caps. Dieckerhoff, Raffloer & Co., Inc., New York, N. Y.

254,900. FORD—cement for fixing tires and tire stopping composition. Ford Motor Co., Fordson, Mich.

254,934. DRIAD—sanitary rubber inserted bloomers. Burtex Co., Inc., New York, N. Y.

254,935. Representation of a lined shield containing a circle with the words: "NORWALK TIRES" and the letter: "N"—tire covers. The Norwalk Tire & Rubber Co., Norwalk, Conn.

Act of March 19, 1920

254,998. MANHATTAN TEE—golf tees made of rubber. The Manhattan Rubber Mfg. Co., Passaic, N. J.

255,002. Representation of a radio panel containing the word: "FLORENTINE"—radio paneling and battery boxes. Hood Rubber Co., Watertown, Mass.

255,004. EVERSAFE—inner tubes for tires. Frederick W. Krone, San Francisco, Calif.

Dominion of Canada

March 5, 1929

45,684. Word: HICKORY—dress shields. A. Stein & Co., Chicago, Ill., U. S. A.

45,690. Letter: "I," surrounded by a hexagonal border, the background within the border being colored red. India Tire & Rubber Co., Akron, O., U. S. A.

March 12. 1929

45,719. Words: "AIR-O-PEDIC ARCH"—boots. shoes. and slippers made wholly or in part of leather, rubber, fiber, canvas, or textile material. Paul C. Wolfer Co., Everett, Mass., U. S. A.

45,743. Word: "USTAN"—footwear composed of rubber, fabric and rubber, and fabric, leather and rubber in combination, together with their accessories, such as rubber and rubber composition soles, heels, taps, and lifts. Dominion Rubber Co., Ltd., Montreal, Que.

March 26, 1929

45,775. Word: "HI-SPEED"—the lettering employed in forming the word being a series of dashes indicative of speed—automobile tires. Gregory Tire & Rubber 1926, Ltd., Port Coquitlam, B. C.

United Kingdom

February 27, 1929

139,428. BULWOOD—cotton bootlaces and elastic composed of cotton and india rubber. M. & J. Huddlestone, 52-54 Main St., Glasgow, C. 5.

498,618. Dark background on which appears the representation of a man carrying an ox, and below a streamer containing the word: "MILO"—goods manufactured from india rubber and gutta percha. Boston Woven Hose & Rubber Co., Cambridge, Mass., U. S. A.

March 6, 1929

B483,542. Representation of an arrow through the word: "HOOD," above a rectangle containing a leaf design and the word: "CLYDE," and below the rectangle the words: "MADE IN U. S. OF AMERICA" —shoes. Hood Rubber Co., 98 Nichols Ave., Watertown, Mass., U. S. A.

498,340. GOLDEN STAR—tires. Pirelli, Ltd., 144 Queen Victoria St., London, E.C.4.

March 13, 1929

B482,655. MILLER — soap dishes, water bottles, syringes and syringe bags (not medical or surgical), insulation gloves, bulbs, cushions, tires and inner tubes made of india rubber, and india rubber sponge substitutes. The Miller Rubber Co., Akron, O., U. S. A.

B496,270. LIMPET TAPE—electric insulating tape. Connollys (Blackley) Ltd., Blackley Vale Mills, Blackley, Manchester.

497,605. Representation of the figure 9 containing the face of a cat and the words: "CATALASTIC WITH NINE LIVES" —elastic sandallings, webs, and cords (india rubber). Tubbs, Lewis & Co., Ltd., 29-30 Noble St., London, E.C.2.

498,745. HERCULEX—baby soothers, feeding bottle teats, enemas, spraying apparatus (medical and surgical), syringes (surgical), and pessaries (not medicated). Lionel Alfred Jackson, trading as The London Rubber Co., 183 Aldersgate St., London, E.C.1.

499,003. NEOZONE — chemical substances used in the manufacture of rubber to retard deterioration due to oxidation. E. I. du Pont de Nemours & Co., Wilmington, Del., U. S. A.

March 20, 1929

485,397. RAILITE—machine belting composed chiefly of balata. W. Gilmour Smith & Co., Ltd., 136 Renfield St., Glasgow, C.2.

March 27, 1929

498,563. Representation of an alligator, and below it the word: "ALLIGATOR"—india rubber goods, not including tobacco pouches and elastic boot webs or any goods of a like kind to these excluded goods. Automotive Spares, Ltd., 164a, King's Rd., Chelsea, London, S.W.3.

Labels

United States

35,490. NEW LIFE TO RUBBER. Rubber renewer and preserver. New Life To Rubber Co., Los Angeles, Calif. Published Nov. 3, 1928.

35,541. GENUINE EVEREADY STIKTITE TUBE REPAIR KIT SELF-VULCANIZING MENDS ANYTHING MADE OF RUBBER. Rubber-patch outfit. Margery A. Reid, doing business as The Pratt-Lane Co., Milwaukee, Wis. Published Dec. 1, 1928.

Statement of India Rubber World

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of INDIA RUBBER WORLD, published monthly, at New York, N. Y., for April 1, 1929.

State of New York } ss.
County of New York }

Before me, a notary public in and for the State and county aforesaid, personally appeared E. M. Hoag, who, having been duly sworn according to law, deposes and says that she is the business manager of the INDIA RUBBER WORLD and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Federated Business Publications, Inc., 420 Lexington Ave., New York, N. Y.; editor, Henry C. Pearson, 420 Lexington Ave., New York, N. Y.; managing editor, William M. Morse, 420 Lexington Ave., New York, N. Y.; business manager, E. M. Hoag, 420 Lexington Ave., New York, N. Y.

2. That the owner is: Federated Business Publications, Inc., Edward Lyman Bill, Inc., Bill, Brown & Bill Publishing Corp., Caroline L. Bill, Raymond Bill, Edward Lyman Bill, Randolph Brown and J. B. Spillane.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by her.

E. M. HOAG, Business Manager.

Sworn to and subscribed before me this 27th day of March, 1929.

[SEAL] WM. A. LOW.

Notary Public, N. Y. Co. No. 695, Reg. No. 9502.
Certificate filed in Queens Co. No. 4826.
(My commission expires March 30, 1929.)

MARKET REVIEWS

CRUDE RUBBER

New York Exchange

APRIL 1. Trading was extremely quiet in the morning and prices were 30 to 50 points lower than Thursday's close, with very little initiative to operate in either direction. The London and Singapore markets were closed, and no information being available, trading was light. Later, however, prices stiffened in anticipation of advanced London cables, and May closed at 23.10; July, 23.60; Sept., 23.90; Dec. 24.10. All quotations were about 10 to 20 points up from the previous close.

APRIL 2. London opened at 11¼ pence for spot and April, about the same as Thursday's close. After fluctuating during the day the market finally closed at 11¼ pence for spot and April. Trading on the Exchange was very quiet, prices easing off 10 points for May, 30 points for July, 20 points for Sept., and 10 points for Dec., on the opening sales. With inactive but steady trading the prices closed at practically the same as Monday: May, 23.10; July, 23.60; Sept., 23.90; Dec., 24.10.

APRIL 3. London opened with spot and April at 11¼ pence. Prices remained at this level until the close when 11 pence was bid with offerings at 11⅛ pence for spot and April. The market opened down about 20 to 30 points on initial sales, and then with commission-house selling and speculative foreign accounts getting out, the market continued weak, closing 60 points down on May, 80 points on July, 90 points on Sept., and 80 points down on Dec. No real buying power being in evidence there were more sellers than buyers and the market closed easy at the following prices: May, 22.30; July, 22.70; Sept., 22.90; Dec., 23.20.

APRIL 4. London opened ⅛ pence down from the previous close, and prices were 10 to 20 points down on the opening sales; but there were more buyers than sellers, and trading was dull and narrow for the first two hours. Later, prices improved, there being little rubber for sale and plenty of buyers for any cheap offers. At 2 o'clock, prices were up 40 points, and from then until the close, buying was active by shorts covering and good trade interest. The market closed 50 to 60 points higher on most every position, and buyers at the closing figures. General sentiment was better and it appeared as if the turn had come. Closing prices: May, 22.70; July, 23.20; Sept., 23.40; Dec., 23.70.

APRIL 5. London opened ⅛ pence higher than the previous close and the prices fluctuated within a narrow range with little interest, May closing at 30 points lower. There was little incentive to trade, and the foreign markets offered no encouragement. Closing prices: May, 22.60; July, 23.10; Sept., 23.30; Dec. 23.50-60.

APRIL 8. The market was dull as prices fluctuated in a range of 30 points with very little doing. Total sales of the day were only 643 lots with practically no inclination or trend in either direction. London remained steady with little shipment rubber being offered in quantities. Closing prices: May, 22.40; July, 22.70; Sept., 23.00; Dec., 23.30.

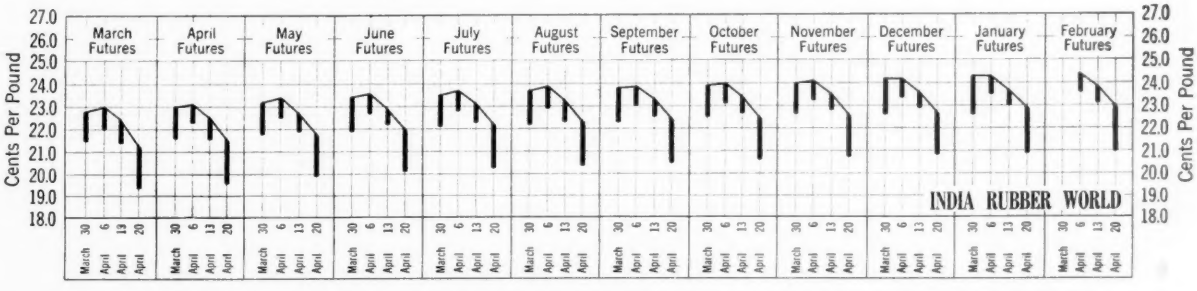
APRIL 9. London held steady, and although early prices were ⅛ pence lower they eventually closed at the high, with Exchange prices higher by 10 to 20 points in practically every position and no evidence of short selling except at the very close when fairly large quantities were offered at the higher figures. The market was extremely dull with no real activity. Closing prices: May, 22.50; July, 22.90; Sept., 23.20; Dec., 23.50.

APRIL 10. London was steady, fluctuating within ⅛ pence either way with no inclination to trade on the Exchange. May, July and Dec. closed off about 20 points on final transactions which looked like manipulation as the quantities were not large. There was no incentive to trade as shipment offers were in small quantities and at unworkable prices. Closing prices: May, 22.30; July, 22.70; Sept., 22.90; Dec., 23.30.

APRIL 11. London was off ⅛ pence on almost every position from the previous close and the market sold off, making new low prices. Around midday prices recovered, and with fairly active buying on every position and from every source the market advanced 30 to 40 points, closing at the following prices: May, 22.40; July, 22.70; Sept., 23.00; Dec., 23.30.

APRIL 12. The Rubber Association figures showed imports of 175,667 tons for three months ended March 31, against 116,582 tons last year; also there was an

New York Rubber Exchange—High and Low Monthly Futures



The Rubber Exchange of New York, Inc.

DAILY MARKET FUTURES—RIBBED SMOKED SHEETS—CLOSING PRICES—CENTS PER POUND—"A" CONTRACTS

Positions 1929	March, 1929						April, 1929																		
	25	26	27	28	29*	30*	1	2	3	4	5	6	8	9	10	11	12	13	15	16	17	18	19	20	22	23	24
April	21.5	22.3	22.1	22.8	....	....	23.0	23.0	22.2	22.6	22.3	22.0	22.3	22.4	22.1	22.1	21.6	21.4	21.3	20.7	20.6	19.9	19.4	19.5	19.5	20.2	19.5
May	21.6	22.4	22.2	23.0	....	....	23.1	23.1	22.3	22.7	22.6	22.3	22.4	22.5	22.3	22.4	21.9	21.6	21.5	20.9	20.8	20.1	19.6	19.6	19.6	20.3	19.7
June	21.8	22.8	22.3	23.2	....	....	23.3	23.4	22.5	22.9	22.9	22.6	22.6	22.7	22.5	22.6	22.1	21.9	21.8	21.1	21.0	20.4	19.9	20.0	19.8	20.6	20.0
July	21.9	23.0	22.5	23.4	....	....	23.5	23.6	22.7	23.1	23.1	22.8	22.7	22.9	22.7	22.8	22.3	22.2	22.0	21.2	21.3	20.6	20.1	20.2	20.1	20.8	20.3
August	22.1	23.2	22.7	23.5	....	....	23.7	23.7	22.8	23.3	23.2	22.9	22.9	23.1	22.8	22.9	22.4	22.3	22.2	21.4	21.5	20.7	20.3	20.4	20.3	21.1	20.5
September	22.2	23.3	22.9	23.7	....	....	23.9	23.9	22.9	23.4	23.3	23.0	23.0	23.2	22.9	23.0	22.6	22.3	22.3	21.6	21.6	20.8	20.4	20.6	20.4	21.2	20.6
October	22.3	23.4	23.1	23.8	....	....	23.9	23.9	23.0	23.4	23.3	23.1	23.1	23.3	23.1	23.1	22.6	22.5	22.4	21.7	21.7	20.9	20.5	20.6	20.6	21.3	20.7
November	22.5	23.6	23.2	23.9	....	....	24.0	24.0	23.1	23.5	23.4	23.2	23.2	23.4	23.2	23.2	22.7	22.7	22.5	21.8	21.8	21.1	20.6	20.7	20.7	21.4	20.8
December	22.6	23.7	23.4	24.0	....	....	24.1	24.1	23.2	23.6	23.5	23.4	23.3	23.5	23.3	23.4	22.8	22.8	22.6	21.9	21.9	21.3	20.7	20.8	20.7	21.5	20.9
1930																											
January	22.6	23.8	23.5	24.2	....	....	24.1	24.2	23.4	23.7	23.6	23.5	23.4	23.6	23.4	23.5	22.9	22.9	22.7	22.0	22.0	21.4	20.8	20.8	20.9	21.7	21.0
February	22.6	23.9	23.6	24.3	....	....	24.2	24.3	23.5	23.8	23.7	23.6	23.5	23.7	23.5	23.6	23.0	23.1	22.9	22.1	22.1	21.5	20.9	20.9	21.0	21.8	21.2
March	....	....	....	....	....	....	24.3	24.4	23.6	23.9	23.8	23.7	23.6	23.8	23.6	23.7	23.1	23.2	23.0	22.2	22.2	21.6	21.0	21.0	21.1	22.0	21.3

*Holiday.

increase in importations of 59,085 tons compared to last year. But against this large importation consumption in March amounted to 44,370 tons, a new high record, and compares with the consumption of 41,594 tons for February and of 35,685 tons for March last year. However, the report was considered as bearish for the reason that with the high consumption there was still plenty of rubber for immediate needs. Heavy offerings were thrown on the market, and practically every position sold off 50 points, or about ½-cent and in some positions 60 points. There was a little support by trade factors, with the result that a fair short covering began and the market closed about 10 points from the low. Closing prices: May, 21.90; July, 22.30; Sept., 22.60; Dec., 22.80.

APRIL 15. London prices were steady but dull with very small fluctuations. The New York market backed and filled in a narrow range of 10 to 20 points, running up 20 points above the previous close at one time and finally closing about 10 points below the previous close with no real definite trend. The market did not appear weak except in a few instances where there was a little short selling but no real pressure. Closing prices: May, 21.50; July, 22.00; Sept., 22.30; Dec., 22.60.

APRIL 16. Trading on the Exchange was heavy, 1,698 lots, or 4,245 tons, changing hands on active trading with values declining 50 to 70 points in various positions and commission-house liquidation catching many stop-loss orders which assisted in further decline. The dealers selling came from those with London connections, so that the lows of the day were made at the close. The decline in London was due to the report that shipments from Malaya were extremely heavy, the estimated figures for April being 42,000 tons. Closing prices: May, 20.90; July, 21.20; Sept., 21.50; Dec., 21.90.

APRIL 17. There was easiness in the primary markets which further discouraged those long of rubber and bullishly inclined, with a result that prices declined. There was good buying by London interests and a considerable absorption by the local trade, which, combined with shorts covering, caused a quick recovery from the early depression. Closing prices: May, 20.80; July, 21.30; Sept., 21.60; Dec., 21.90.

APRIL 18. The market opened about 20 to 30 points higher than the closing prices, and a further advance in prices was expected. However, as the day progressed the market had little real support and, after fluctuating in a narrow range of 10 to 20 points, it sold off about 80 points from the previous close. Active trading and an extremely irregular market resulted in prices, closing on the low or, in some positions, 10 points higher. The cause of this further decline was unknown, but there was no real incentive to buy rubber at these prices with plenty of rubber offered from the Far East. The market seemed demoralized and no one knows where the bottom may be. Closing prices: May 20.10; July, 20.60; Sept., 20.80; Dec., 21.30.

APRIL 19. The market opened quite steady, and in the early trading advanced 20 points on nearly every position, but with weaker London cables and further selling on every side together with little covering, prices continued to decline. The market sold off 60 points lower than Thursday's close and closed weak with final sales only 10 points higher than the low of the day. The decline found little support, and factories picked up a little rubber for immediate needs. There appeared to be plenty of rubber, but it was arriving at the wrong time when the factories might be slowing down for the summer months. Closing prices: May, 19.60; July, 20.10; Sept., 20.40; Dec., 20.70.

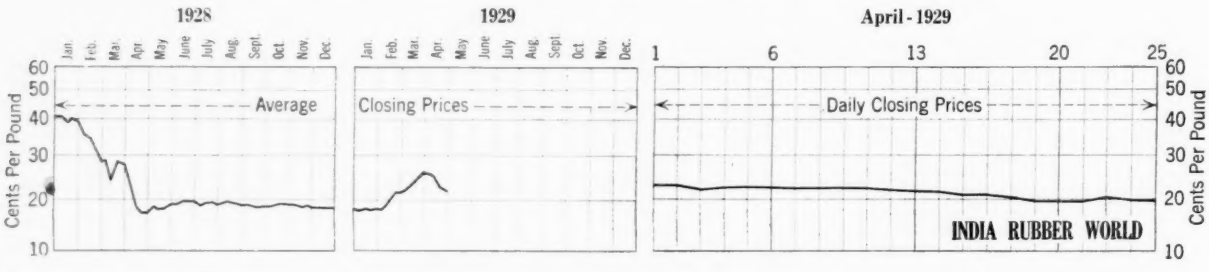
APRIL 22. Trading on the Exchange was dull with London prices fluctuating in a ⅛ to 1/16 pence range while Exchange prices moved backwards and forwards, at one time being 20 to 30 points higher in some positions but closing at practically Saturday's figures. There was no incentive to trade nor any specific trend to the market, which closed very steady at these figures: May, 19.60; July, 20.10; Sept., 20.40; Dec., 20.70.

APRIL 23. For the first time in several weeks the Exchange market showed a distinctly firmer undertone, opening up 30 to 40 points higher than the previous close. The opening prices were practically the low of the day, for the market advanced during the day and closed on the top with a net advance of 70 to 80 points on all positions. The London market advanced ⅛ pence and held steady and firm at the close. This, together with good trading and short covering stiffened the market. Closing prices: May, 20.30; July, 20.80; Sept., 21.20; Dec., 21.50.

APRIL 24. The market opened steady with London cables of ⅛ pence higher, and the early trading advanced 10 points over Tuesday's close. On the withdrawal of "pool" support and lack of buying orders the market slid off, and prices declined 50 to 60 points in every position. There was a lack of support in all directions not only from trade interests but others, and on weaker offering there was no inducement to buy rubber. There was no incentive to those bullishly inclined to take on long commitments, especially with the amount of rubber available in sight. Closing prices: May, 19.70; July, 20.30; Sept., 20.50; Dec., 20.90.

APRIL 25. The market opened fairly steady with London prices practically unchanged from last night's close, but the New York market did not follow London prices, and opening bids were lower than the previous close. During the day, prices sold off about 30 points on every position and closed practically on the lows of the day. Trading was very mixed with no definite trend, and except for scattered support by uptown interests it looked as if the market might close even weaker. There

New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets



New York Outside Market—Spot Closing Rubber Prices—Cents Per Pound

	March, 1929						April, 1929																
PLANTATIONS	25	26	27	28	29*	30*	1	2	3	4	5	6	8	9	10	11	12	13	15	16	17	18	19	20
Sheet																								
Ribbed smoked	21⅝	22⅜	22⅛	22⅞	....	....	22⅞	23	22	22⅝	22½	22⅜	22¼	22⅜	22¾	22¼	21¾	21⅝	21½	20¾	20⅞	20⅛	19⅝	19¾
Crepe																								
First latex	22¼	22¾	22½	23⅛	....	....	23¼	23¼	22⅜	23	22¾	22¼	22⅝	22¾	22⅝	22¾	22¼	21⅞	21⅞	21¼	21¼	20½	20	20⅛
"B" blanket	19⅛	19¾	19½	20⅛	....	....	20⅛	20⅛	19⅞	20	20	19⅞	19⅞	20	19⅜	20	19⅜	19½	19¼	18¾	18¾	18½	18¼	18¼
"C" blanket	19	19½	19¼	19⅞	....	....	20⅛	20⅛	19⅝	19¾	19⅝	19⅝	19⅝	19¾	19⅝	19¾	19¼	19	19	18½	18½	18¼	18	18
"D" blanket	18⅝	19¼	18⅞	19⅜	....	....	19½	19¾	19¼	19⅜	19¼	19¼	19½	19¼	19½	19¾	18⅝	18½	18½	18	18	17½	17⅜	17¾
No. 2 brown	18⅞	19⅜	19⅜	19⅞	....	....	20	20⅛	19½	19¾	19⅝	19½	19½	19⅝	19⅝	19⅝	19⅛	19	19	18⅜	18¾	18⅛	17¾	17⅞
Rolled brown	15¼	15½	15⅛	15¾	....	....	15⅞	15¾	15	15⅝	15⅛	15¼	15¼	15⅛	15	15	14⅝	14½	14⅜	13¾	13⅞	13½	13¾	13½
Off latex	21¾	22⅜	22⅛	22¾	....	....	22¾	23	22⅛	22⅝	22½	22½	22⅜	22⅜	22⅜	22½	22	21⅝	21⅝	21	21	20⅛	19¾	19⅞

*Holiday.

was no incentive to buy as factories appeared at a standstill, and a little scattered short covering at the close prevented the market from falling off further.

The market for the month has been a discouragement and hardship for those bullishly inclined, while those who have been short have had things all their own way. There was no incentive for any large trading, and outside speculators have stood on one side to a large extent.

New York Outside Market

APRIL 1. Little can be said of the outside market as dealers would not quote prices without knowing the price of rubber in the primary markets. The majority of the dealers watch Exchange prices and form their opinion of the general trade.

APRIL 2. Offers for actual rubber from Singapore were too high to attract buyers among dealers. It was said that where bids had been made for 500 to 600 tons, counter-offers were made which amounted to only 50 to 60 tons. In other words, there were some buyers for weight, at prices, but offers were of small proportion and at high figures. Twenty-three and one-quarter cents was paid for spot and bid for April-June without sellers.

APRIL 3. Following further decline on the Exchange, after the Easter holidays, prices eased off with buyers for spot and April at 22 cents; Sept., 23 cents; and Oct.-Dec., 23½ cents. The factories not having followed up the advance on Thursday, before the holidays, seemed justified as they were able to buy on this decline at better prices. However, they did not get all the rubber wanted as London was getting better prices on the Continent, with the result that the outside market was a little steadier than the Exchange although the factories were not reaching for rubber.

APRIL 5. The outside market was very quiet with no special inducement to trade in either direction although prices were about Thursday's close, which were ⅛ pence down from the previous figures.

APRIL 8. Rubber was ⅛-cent lower on Crepe, while Ribs remained about the same. Dealers were picking up any cheap offer of shipment rubber, and the factories were feeling out the market with low bids. There was very little rubber offered in quantities from the Far East and any cheap offer was taken, especially the nearby positions. Bids for large quantities of late have been made, but in every instance only a portion of the bids have been booked. Off-grades, such as Browns and Ambers, were scarce, and it is an old saying in the trade that when these grades are scarce the market shows strength and is apt to work upwards.

APRIL 9. The market showed a decided tightness as April-May rubber was sold in the early afternoon at 22⅝ cents in Akron, but later it was not obtainable at 22⅞ cents. April and May rubber was getting very scarce and dealers were bidding in London in order to get rubber here on time to fill contracts. First Latex Crepe is scarce and at a premium of about ¾ to 1 cent over Ribs. There is quite a large short interest and unless they can get rubber in the near future they may have to pay higher prices in order to make deliveries.

APRIL 10. The market was dull, factories showing little inclination to bid and only picking up any cheap offers which happened to appear. Those with foreign accounts had very little actual rubber to offer and could not get the quantities desired; so the market as a whole was a very dull affair.

APRIL 12. Rubber manufacturers and dealers, after scanning the Rubber Association figures, did not seem inclined to bid for rubber, especially as the Exchange prices showed a weakness of about ½-cent. There seems to be no disposition to throw shipment rubber on the market, and the foreign holders are selling sparingly and not accepting quantities that are bid for.

APRIL 15. The market continued dull with factories nibbling at small quantities with low price bids. Dealers were picking up shipment offers when available at prices desired. It was said that those who obtained offers from the East in large quantities had only 25 to 50 tons to offer, and these offers were taken by the trade.

APRIL 16. The market showed a further decline of about ¼ to ⅜-cent in almost every position. This was due to a further decline in London and attributed to the large importation of rubber for the first half of April. A fair business was put through with the factories on this decline and some of the large dealers were fairly good purchasers of shipment rubber.

APRIL 17. The market showed a further decline, being down about ⅛ to ¾-cent on almost every position. This was due to the easiness in the primary markets, which caused further liquidation of tired long holders, and on this weakness good buying was in evidence by leading interests in London. There was little shipment rubber offered and the market closed fairly steady.

New York Quotations

Following are the New York open market rubber quotations for one year ago, one month ago and April 25, the current date

Plantation Hevea	April 25, 1928	March 25, 1929	April 25, 1929
Rubber latex (Hevea)...gal.	$1.50 @	$1.40 @	$1.40 @
CREPE			
First latex spot	.17¼@.17½	.23½@	.20¼@.20½
April	.17¼@.17⅜	.23½@	.20½@
May-June	.17½@	.23¾@	.20½@
July-Sept.	.17¾@	.24 @	.20¾@
Oct.-Dec.	.18 @	.24½@	.21⅛@
Off latex, spot	@	.22½@	.20 @
"B" Blanket, spot	.16 @.16¾	.19½@	.18⅛@
April	.16 @.16¼	.19¼@	.18⅜@
May-June	.16¼@	.19½@	.18⅝@.18¼
July-Sept.	.16½@.16¾	.19¾@	.18⅜@
Oct.-Dec.	.16¾@.17	.20 @	.18⅝@
"C" Blanket, spot	.15¾@	.19 @	.17⅞@
Brown No. 1	.15½@.15¾	.19¼@.19½	.18⅛@
Brown No. 2	.15¼@	.19 @.19¼	.17⅞@
Brown, roll	.14½@.15	.14¾@.15	.13 @
Sheet			
Ribbed, smoked spot	.17 @	.22½@	.19¾@
April	.16¾@.17	.22½@	.19¾@
May-June	.17 @.17¼	.22¾@	.19⅞@
July-Sept.	.17¾@.17½	.23 @	.20⅛@
Oct.-Dec.	.17⅝@.17¾	.23½@	.20¾@
East Indian			
PONTIANAK			
Banjermasin	.08½@.09½	.09 @.09½	@
Pressed block	.14 @.14½	.15½@	.16 @
Sarawak	.09½@	.10½@	@
South American			
PARAS			
Upriver, fine	.17½@.17¾	.23 @.23½	.21¼@
Upriver, fine	*.26½@	@	@
Upriver, coarse	.15 @	.13½@.14	.12¾@
Upriver, coarse	*.23 @	@	@
Islands, fine	@	.18 @.18½	.18 @
Islands, fine	*.26 @	@	@
Acre, Bolivian, fine	.18 @	.23½@.24	.21¾@
Acre, Bolivian, fine	*.27 @	@	@
Beni, Bolivian	.19 @	.24 @.24½	.22 @
Madeira, fine	.18 @	.23 @	.21¼@

South American	April 25, 1928	March 25, 1929	April 25, 1929
PARAS—*Continued*			
Peruvian, fine	.17 @	.22 @	.20 @
Tapajos, fine	.17 @	.22 @	.20 @
CAUCHO			
Upper caucho ball	.15 @	.13½@.14	.12¾@
Upper caucho ball	*.23 @	@	@
Lower caucho ball	@	.14 @	.12¼@
Maniçobas			
Ceará negro heads	†.17 @	†.19 @	†.20 @
Ceará scrap	†.09 @	†.11 @	†.12 @
Manicoba, 30% guaranteed	†.19 @	†.21 @	†.22 @
Mangabiera, thin sheet	†.19 @	†.21 @	†.22 @
Centrals			
Central scrap	.15 @.15½	.12 @.13	.11½@.12½
Central wet sheet	@	@	@
Corintò scrap	.15 @.15½	.12 @.13	@
Esmeralda sausage	@	.12 @.13	.11½@.12½
Guayule			
Duro, washed and dried	.20 @	.20 @	.20 @
Ampar	@	.21½@	.21½@
Gutta Percha			
Gutta Siak	.18 @.18½	.19½@.20	.20 @
Gutta Sch	.29 @	.31 @.32	@
Red Macassar	2.99 @3.00	2.25 @	3.00 @
Balata			
Block, Ciudad Bolivar	.39 @.40	†.49 @	.51 @
Colombia	.42 @.43	†.47½@	@
Manaos block	.46 @	.57 @	.58 @
Panama	@	@	@
Surinam sheet	.51 @.52	.52 @	.52 @
Amber	.54 @	.54 @	.53½@
Chicle			
Honduras	‡.65 @	‡.68 @	‡.68 @
Yucatan, fine	‡.65 @	‡.68 @	‡.68 @

*Washed and dried crepe. Shipment from Brazil.
†Nominal. ‡Duty paid.

APRIL 19. The market established a new low record, the May position selling below 19 cents for the first time in many weeks. Short covering and some commission-house buying attracted a slight up-turn, but this caused only further selling by professionals and foreign interests. It was reported that the Far East had accepted very few bids and was holding offers at prices above a workable basis and, as the factory business which was put through on the decline was so small, there was really no support to hold the market. Ribbed Smoked Sheets were offered at 19⅝ cents for spot and April.

APRIL 22. There was a better feeling in the crude rubber circles as offerings from the Far East were very limited and firmly held. There had been quite an absorption by American factories during the break which was thought caused the small offering from the East today. In other words, American interests thought the prices on this level attractive enough to take in a good supply rather than wait for another decline.

APRIL 23. The market showed continued strength on factory business and lack of offering together with good trade buying. Prices came back ½ to ¾-cent, and, although factories did not follow this advance, yet there was enough inquiry to make dealers reluctant to sell, especially as the strength on the Exchange indicated good short covering and further buyers. The market closed practically at the top with dealers holding back, preferring not to sell until they found out what reaction this advance had in the primary markets and what foreign offers were available in the morning.

APRIL 24. Apparently the inquiry and the buying in Singapore on Monday and the advance in the market on Tuesday were not followed up by factories. It was reported there were buyers for nearby positions for fairly large quantities at 20 cents for spot and 21 cents for July-Sept., but when weakness on the Exchange was evident, the factories withdrew and lowered their bids ½ to ¾-cent, so that it made trading practically impossible.

APRIL 25. There was enough rubber offered from foreign shippers to take care of any demand in the outside market, and on the continued weakness on the Exchange, where prices were down about 30 points from the previous close, sellers were more inclined to accept bids although on this continued weakness very little factory business was reported, because of the fact that after the strength of two days ago and a continued decline, factories preferred to stay out of the market until they could see a more definite trend, or prices went even lower.

March Imports

Importations of all grades of rubber in March, 1929, were 53,824 tons, compared with 40,894 tons for March, 1928. Plantation arrivals for March, 1928, were 51,661 tons, compared with 37,545 tons a year ago. Total imports for three months ended March 31, 1929, were 170,667 tons, compared with 116,582 tons for the same period one year ago.

Rubber Afloat to the United States

All figures in long tons.

Week Ended	British Malaya	Ceylon	Netherland East Indies	London and Liverpool	Total
Mar. 30..	7,333	923	1,596	45	9,897
Apr. 6..	9,234	1,037	1,975	10	12,256
Apr. 13..	7,061	458	1,935	..	9,454
Apr. 20..	6,863	740	1,886	112	9,601

RECLAIMED RUBBER

RUBBER manufacturers' demand for reclaims is maintained at a high level, and, in fact, is practically up to capacity of 24-hour production of the reclaiming facilities for high grade reclaimed rubber.

Some plants are reported over-sold well into the summer. It is believed that the 1928 reclaim consumption total of 223,000 long tons will be exceeded in the present year.

Reclaim is fast becoming to be regarded by compounders less as a mere substitute for crude rubber and more as a range of compounding ingredients possessing valuable working qualities that adapt it to various compounding requirements of economy and service.

Quotations on the standard list of reclaims quoted below have remained unchanged for two months, notwithstanding that during this period crude rubber steadily declined from 26 cents March 1 to 20 cents April 24.

The standard grades are listed and quoted as follows:

New York Quotations

April 25, 1929

High Tensile	Spec. Grav.	Price	Per Pound
Super-reclaim, black	1.20	$0.13	@$0.13½
red	1.20	.13	@ .13½
Auto Tire			
Black	1.21	$0.08	@$0.08½
Black selected tires	1.18	.08½	@ .09
Dark gray	1.35	.10	@ .10½
Light gray	1.38	.12	@ .12½
White	1.40	.13	@ .13½
Shoe			
Unwashed	1.60	.07¼	@ .07½
Washed	1.50	.10	@ .10¼
Tube			
No. 1	1.00	.14	@ .14½
No. 2	1.10	.11	@ .11½
Miscellaneous			
Red	1.35	.12½	@ .13
Truck tire, heavy gravity	1.55	.07	@ .07¼
Truck tire, light gravity	1.40	.07½	@ .07¾
Mechanical blends	1.60	.07	@ .07½

RUBBER SCRAP

RUBBER scrap grades in April became weaker, influenced by the decline in crude rubber and the increase of tonnages collected. Consuming demand is very good in view of these conditions. Quotations on practically two-thirds of the listed market grades experienced small reductions over those reported one month ago. The outlook for spring business is good.

Boots and shoes are easier, black grade is quoted 1½ cents, flat, down ⅛ from last month. Tennis and soles are also down ¼-cent.

Pneumatic tires, with and without beads, are in demand at easier prices owing to increased collections. The only grade unchanged is white tires without beads, the reason being their scarcity since the general use of carbon black in place of zinc oxide as a reenforcing ingredient in tire tread stocks.

Hard rubber scrap remains unchanged in price.

Inner Tubes. No. 1 grade has declined ½-cent, No. 2 is ¾-cent down from last month, and the same is true of the red and mixed tube grades.

CONSUMERS' BUYING PRICES

Carload Lots

April 25, 1929

Boots and Shoes		Prices
Boots and shoes, black	*lb.*	$0.01½@
Untrimmed arctics	*lb.*	.01 @ .01¼
Tennis shoes and soles	*lb.*	.00¼@ .00⅜
Hard Rubber		Prices
No. 1 hard rubber	*lb.*	$0.08 @$0.08½
Mechanicals		
Mixed black scrap	*lb.*	.00½@ .00⅝
Hose, air brake	*ton*	32.50 @35.00
regular soft	*lb.*	.00¾@ .00⅞
No. 1 red	*lb.*	.02 @ .02¼
No. 2 red	*lb.*	.01 @ .01½
White druggists' sundries	*lb.*	.02 @ .02½
Mechanical	*lb.*	.01½@ .01⅝
Tires		
Pneumatic Standard—		
Mixed auto tires with beads	*ton*	24.50 @25.50
Beadless	*ton*	33.00 @34.00
White auto tires with beads	*ton*	40.00 @42.00
Beadless	*ton*	48.00 @49.00
Mixed auto peeling	*ton*	37.00 @39.00
Solid—		
Mixed motor truck, clean	*ton*	23.00 @23.50
Inner Tubes		
No. 1, floating	*lb*	.07 @ .00⅞
No. 2, compounded	*lb.*	.04¼@ .04⅜
Red	*lb.*	.05 @ .05¼
Mixed tubes	*lb.*	.04½@

Compounding Ingredients

RUBBER compounding ingredients of all the standard brands and varieties are in active demand in essentially all lines of rubber goods manufacture. Footwear is the only line in which production is much under normal.

ACCELERATORS. The trend in accelerators is strongly toward those that facilitate low-temperature cures with high tensile properties. To meet the growing demand along this trend, new accelerators are being developed and announced at short intervals. The latest announcement of this sort is R & H 397, a rapid, low-temperature accelerator.

ANTIOXIDANTS. These are now differentiated into those that preserve rubber goods against oxidation, those that inhibit fatigue caused by flexing, and those that prevent surface cracking by exposure to sunlight. Development is progressing according to this differentiation and from time to time announcements of new products may be expected.

BENZOL. Production and demand are heavy and expanding. Prices are firm.

CARBON BLACK. Consumption by the tire and mechanical branches of the rubber industry is very active. Prices are firm.

CLAY. This cheap reenforcing material is always in active demand and is invaluable as an all-around filler and cost reducer.

DEGRAS. Interest in degras is reported to be increasing with compounders and reclaimers. Offerings are light and the price steady.

LITHARGE. Owing to the decline of pig lead, prices for the commercial grade of litharge were reduced ¼-cent a pound, three successive weeks in April bringing the price to 9¾ cents a pound. Demand is fair and movement seasonal.

MINERAL RUBBER. Technical qualities, general adaptability, and price are the basic factors for the steadily increasing use of mineral rubber.

SOLVENT NAPHTHA. Production of this material is reported to be sold ahead for one month, with the output in free movement.

V. M. P. NAPHTHA. Demand is routine and price steady.

STEARIC ACID. There is a good demand for all grades. Prices are steady.

ZINC OXIDE. It is reported that up to April 1 a large proportion of the output went into the rubber trade. Prices are firm.

New York Quotations

April 25, 1929

Accelerators, Inorganic

Lead, carbonate	lb.	$0.09	@
Lead, red	lb.	.10½	@
sublimed white	lb.	.08½	@
sublimed blue	lb.	.08½	@
super-sublimed white lead	lb.	.08¾	@
Lime, R. M. hydrated	ton	20.00	@
Litharge	lb.	.09½	@
Magnesia, calcined heavy	ton	80.00	@90.00
Magnesia carbonate	lb.	.08¾	@ .11
Orange mineral A.A.A.	lb.	.12½	@

Accelerators, Organic

A-7	lb.	.55	@ .65
A-11	lb.	.62	@ .75
A-16	lb.	.57	@ .65
A-19	lb.	.58	@ .75
A-20	lb.	.64	@ .80
A-32	lb.	.80	@ .95
Aero X	lb.	.60	@ .65
Albasan	lb.	.70	@ .75
Aldehyde ammonia	lb.	.65	@ .70
B. B.	lb.		@
Captax	lb.		@
Crylene, hard form	lb.		@
Paste	lb.		@
D. B. A.	lb.	2.00	@
Di-ortho-tolylguanidine	lb.	.42	@ .47
D. P. G.	lb.	.30	@ .35
Ethylidine aniline	lb.	.45	@ .47½
Formaldehyde aniline	lb.		@
Grasselerater 102	lb.		@
552	lb.		@
808	lb.		@
833	lb.		@
Heptene	lb.	.40	@
Lead oleate, No. 999	lb.	.154	@
Witco	lb.	.14	@
Lithex	lb.	.18	@ .20
Methylene dianiline	lb.	.37½	@ .40
Monex	lb.	3.25	@
Plastone	lb.		@
R-2	lb.	2.00	@ 2.50
R. & H. 40	lb.	.40	@ .42½
50	lb.	.40	@ .42½
Safex	lb.	1.20	@
Sunproof	lb.	.50	@
Super-sulphur, No. 1	lb.		@
No. 2	lb.		@
Tensilac No. 39	lb.	.40	@ .42½
No. 41	lb.	.50	@ .52½
Thermlo F.	lb.	.50	@ .55
Thiocarbanilid	lb.	.23	@ .27
Trimene	lb.	.75	@
base	lb.	1.20	@
Tuads	lb.		@
ZBX	lb.	2.50	@
Z-88	lb.	.50	@ .60
Zimate	lb.		@

Acids

Acetic 28% (bbls.)	100 lbs.	3.88	@ 4.13
glacial (carboys)	100 lbs.	14.18	@14.43
Sulphuric, 66°	100 lbs.	1.60	@

Alkalies

Caustic soda, 76% solid	100 lbs.	2.90	@

Anti-Oxidants

Age-Rite, powder	lb.		@
resin	lb.		@
white	lb.		@

Anti-Oxidants—(*Continued*)

Antox	lb.		@
Grasselerager A	lb.		@
Resistox	lb.	$0.54	@$0.65
Stabilite	lb.	.64	@
V. G. B.	lb.		@

Colors

BLACK

Bone	lb.	.07	@ .09
Carbon (see compounding ingredients)			
Drop	lb.	.05½	@ .15
Lampblack (commercial)	lb.	.09	@

BLUE

Akco blue	lb.	1.80	@
Huber Brilliant	lb.	4.20	@ 4.70
Prussian	lb.	.35	@ .37
Ultramarine	lb.	.06	@ .30

BROWN

Huber Mocha	lb.	1.60	@ 2.10
Sienna, Italian, raw	lb.	.05½	@ .12½

GREEN

Akco green	lb.	2.60	@
Chrome, light	lb.	.27	@ .31
medium	lb.	.28	@ .31
Huber Brilliant	lb.	4.35	@
Oxide of chromium	lb.	.31	@ .38

ORANGE

Huber Persian	lb.	.50	@ 1.00

RED

Akco red	lb.	2.75	@
Antimony			
Crimson, R. M. P. No. 3	lb.	.48	@
Sulphur, free	lb.	.52	@
Vermilion, No. 5	lb.		@
No. 15	lb.		@
Golden, No. 40	lb.		@
No. 60	lb.		@
15/17%	lb.	.21	@ .22
7-A	lb.	.35	@
Z-2	lb.	.22	@
Aristi	lb.	2.75	@
Huber Brilliant	lb.	1.35	@ 1.85
Iron Oxides			
bright pure domestic	lb.	.12	@
bright pure English	lb.	.12	@ .14
bright reduced English	lb.	.10	@
bright reduced domestic	lb.	.10	@
Indian (maroon), pure domestic	lb.	.11	@
Indian (maroon), pure English	lb.	.10½	@ .11
Indian (maroon), reduced English	lb.	.07	@ .09½
Indian (maroon), reduced domestic	lb.	.08	@
Oximony	lb.	.13¼	@
Spanish red oxide	lb.	.04	@
Sunburnt red	lb.	.14¼	@
Venetian reds	lb.	.02	@ .06
Vermilion, Eng. quick-silver	lb.	1.95	@

Colors—(*Continued*)

WHITE

Lithopone	lb.	$0.05½	@
Albalith	lb.		@
Azolith	lb.	.05¼	@ .05¾
Grasselli	lb.	.05¼	@ .05¾
Sterling	lb.		@
Vanolith	lb.	.05½	@ .05¾
Titanox	lb.	.09½	@ .10
Zinc Oxide			
AAA (lead free)	lb.	.07	@
Azo (factory):			
ZZZ (lead free)	lb.	.06½	@ .07
ZZ (leaded)	lb.	.06¼	@ .06¾
Z (8% leaded)	lb.	.06¼	@ .06¾
Green seal	lb.		@
Kadox	lb.		@
Red seal	lb.		@
Special	lb.		@
White seal	lb.		@
XX green label	lb.		@
XX red label	lb.		@

YELLOW

Akco yellow	lb.	1.45	@
Cadmium sulphide	lb.	.95	@ 1.75
Chrome	lb.	.16½	@ .17
Grasselli cadmium	lb.		@
Huber canary	lb.	3.30	@ 3.80
Ochre, domestic	lb.	.01⅝	@ .02⅛
Ochre, French	lb.	.02	@ .03
Oxide, pure	lb.	.08½	@
Zinc, C. P., imported	lb.	.23	@

Compounding Ingredients

Aluminum flake (sacks, c.l.)	ton	21.85	@
(sacks l.c.l.)	ton	24.50	@
Ammonium carb. pwd.	lb.	.10	@
lump	lb.	.09	@
Asbestine	ton	13.40	@14.50
Barium, carbonate	ton	58.00	@
Baryta white (f.o.b. St. Louis, bbls.)	ton	23.00	@
Baryta white (f. o. b. St. Louis, (paper bags)	ton	22.20	@
Barytes, imported	ton	27.00	@34.00
off color	ton	12.00	@20.00
Foam "A" (f. o. b. St. Louis, bbls.)	ton	23.00	@
Foam "A" (f. o. b. St. Louis, bags)	ton	23.00	@
Basofor	lb.		@
Blanc fixe, dry	lb.	.04½	@
pulp	ton	42.50	@45.00
Carbon Black			
Aerfloted arrow	lb.	.08½	@ .12
Compressed	lb.	.08½	@ .12½
Fumonex	lb.	.06	@ .09
Micronex	lb.	.09	@ .13
Uncompressed	lb.	.08	@ .12
Velvetex	lb.	.04½	@ .06
Carrara filler	ton		@
Chalk	ton	12.00	@
Clay, Blue Ridge, dark	ton		@
Blue Ridge, light	ton		@
China	lb.	.01¼	@
Dixie	ton		@
Langford	ton		@
Mineral flour (Florida)	ton		@
Perfection	ton	30.00	@
Suprex	ton	10.00	@22.00
Tensulite	ton	25.00	@

Compounding Ingredients *(Continued)*

Cotton flock, black	lb.	$0.13	@
light-colored	lb.	.10	@ .12
white	lb.	.12	@ .30
Glue, high grade	lb.	.25	@ .30
low grade	lb.	.22	@ .26
Infusorial earth	ton	35.00	@
Mica, amber (fact'y)	ton	90.00	@
Neomerpin, S. A. conc.	lb.	.60	@
Pumice stone, powd.	lb.	.02½	@ .04
Rottenstone (bbls.)	lb.	.02½	@ .04½
Shellac, fine orange	lb.	.70	@
Soapbark	lb.	.15	@ .16
Soapstone	ton	15.00	@22.00
Talc, domestic	ton	25.00	@
French	ton	18.00	@22.00
Pyrax A	ton		@
B	ton		@
Thermatomic carbon	lb.		@
Whiting			
Domestic	100 lbs.	1.00	@
English, cliffstone	100 lbs.	1.50	@
Quaker	ton		@
Slate flour, gray (fact'y)	ton	7.00	@
Snow white	ton		@
Sussex	ton		@
Vancolloid	ton	27.00	@
Vansulite	ton	26.00	@
Westminster Brand	100 lbs.		@
Witco (l. c. l.) (f. o. b. New York)	ton	20.00	@
Whiting, imp. chalk	100 lbs.	.80	@ 1.25
Paris White, English cliffstone	100 lbs.	1.50	@ 3.00

Factice—See Rubber Substitutes

Mineral Rubber

Fluxrite (solid)	lb.	.05½	@ .06
Genasco (fact'y)	ton	50.00	@52.00
Gilsonite (fact'y)	ton	37.14	@39.65
Granulated M. R.	ton		@
Hydrocarbon, hard	ton		@
Hydrocarbon, soft	ton		@
Ohmlac Kapak, M. R.	ton	40.00	@90.00
M-4	ton	175.00	@
Paradura (fact'y)	ton	62.50	@65.00
Pioneer, M. R., solid (fact'y)	ton	40.00	@42.00
M. R. granulated	ton	50.00	@52.00
Robertson, M. R., solid (fact'y)	ton	34.00	@80.00
M. R. gran. (fact'y)	ton	38.00	@80.00
Vansul Puro	ton	27.00	@

New York Quotations

April 27, 1929

Oils

Kerosene	gal.	$0.15	@
Mineral	gal.	.20	@
Poppy seed oil	gal.	1.70	@ 1.85
Rapeseed	gal.	.88	@
Red oil, distilled	lb.	.11⅛	@ .11⅝
Rubber process	gal.	.25	@
Spindle	gal.	.30	@

Rubber Substitutes or Factice

Black	lb.	.08	@ .14
Brown	lb.	.09	@ .15
White	lb.	.09	@ .16

Softeners

Burgundy pitch	100 lbs.	5.50	@ 6.00
Atlas	100 lbs.	6.50	@
Corn oil	lb.	.10½	@
Cottonseed oil	lb.	.11½	@
Cycline oil	gal.	.26	@ .34
Degras	lb.	.03⅝	@ .04¼
Fluxrite (fluid)	lb.	.05½	@ .06
Moldrite	lb.	.06½	@ .07½
Palm oil (Lagos)	lb.	.09¼	@
Palm oil (Niger)	lb.	.08¾	@
Palm oil (Witco)	lb.	.11	@
Para-flux	gal.	.17	@
Petrolatum, snow white	lb.	.08½	@ .08¾
Pigmentar	lb.	.038	@ .0446
Pine oil, steam distilled	gal.	.62	@ .63
Pine tar (retort)	gal.	.28	@
Rosin K	bbl.	9.15	@
Rosin oil, compounded	gal.	.30	@
No. 3, deodorized	gal.	.58	@
No. 556, deodorized	gal.	.49	@
Rubite	lb.	.10½	@
Rubtack	lb.	.08½	@
Stearex	lb.	.15½	@ .20
Stearic acid, double pressed	lb.	.16½	@ .17
Tackol	lb.	.09	@ .15
Tasco W-S No. 1	lb.		@
A	lb.		@
Vansulol	lb.	.12½	@
Vantar (Pine Tar)	gal.	.35	@
Waxene	lb.	.30	@ .40
Woburn oil	lb.	.05½	@ .06

Solvents

Benzol (90%, 7.21 lbs. gal.)	gal.	$0.28	@
Carbon bisulphide (99.9%, 10.81 lbs. gal.) (drums)	lb.	.05½	@ .08
tetrachloride (99.7%, 13.28 lbs. (gal.) (drums)	lb.	.06¼	@ .10
Cyclohexanone	lb.	.70	@
Dip-Sol	gal.	.13	@
Dryolene, No. 9	gal.	.10½	@
Gasoline			
No. 303			
Tankcars	gal.	.15	@
Drums, c. l.	gal.	.31	@
Drums, l. c. l.	gal.	.36	@
Hexalin	lb.	.60	@
acetate	lb.	.70	@
Rub-Sol	gal.	.10½	@
Solvent naphtha	gal.	.35	@
Stod-Sol	gal.	.10	@
Sweet rubber cement naphtha	gal.	.16½	@
Turpentine, Venice	lb.	.20	@
steam distilled	gal.	.48	@ .52

Vulcanizing Ingredients

Sulphur			
Velvet flour (240 lb. bbls.)	100 lbs.	2.95	@ 3.50
(150 lb. bags)	100 lbs.	2.60	@ 3.15
Soft rubber (c.l.)	100 lbs.	2.40	@ 2.75
(l.c.l.)	100 lbs.		@
Superfine commercial flour (210 lb. bbls.)	100 lbs.	2.55	@ 3.10
(100 lb. bags)	100 lbs.	2.40	@ 2.80
Tire brand, superfine,	100 lbs.	1.90	@ 2.25
Tube brand, velvet	100 lbs.	2.40	@ 2.75
Sulphur chloride	lb.	.05	@ .07
Vandex (selenium) (See also Colors—Antimony)	lb.		@

Waxes

Beeswax, white, com.	lb.	.50	@ .55
carnauba	lb.	.40	@ .41
ceresine, white	lb.	.10	@ .11
montan	lb.	.07	@ .07½
ozokerite, black	lb.	.24	@ .25
green	lb.	.26	@ .30
Paraffin			
122/124 white crude scale	lb.	.05	@
124/126 white crude scale	lb.	.05	@
120/122 fully refined	lb.		@
125/127 fully refined	lb.		@

Rims Approved by Tire & Rim Association

Rim Size	March, 1929 Number	March, 1929 Per Cent	3 Months, 1929 Number	3 Months, 1929 Per Cent
Motorcycle				
24 x 3 "CC"	4,505	0.2	7,721	0.1
24 x 3 Std.	.....	...	4,200	0.1
26 x 3 "CC"	.....	...	756	0.0
28 x 3 "CC"	683	0.0	1,020	0.0
Clincher				
30 x 3½	28,417	1.1	100,924	1.5
18" Balloons				
18 x 4	125,268	4.8	330,013	4.9
18 x 3.25	28,871	1.1	52,343	0.8
18 x 4½	29,591	1.1	84,421	1.3
18 x 5	3,509	0.1	15,223	0.2
19" Balloons				
19 x 2.75	47,447	1.8	112,753	1.7
19 x 3½	54,147	2.1	278,348	4.2
19 x 4	582,333	22.3	1,386,021	20.7
19 x 3.25	.....	...	64,593	1.0
19 x 4½	71,315	2.7	169,530	2.5
19 x 5	18,957	0.7	34,772	0.5
20" Balloons				
20 x 2.75	642,352	24.6	1,573,575	23.5
20 x 3½	18,135	0.7	41,957	0.6
20 x 4	295,904	11.3	740,986	11.1
20 x 4½	41,285	1.6	133,927	2.0
20 x 5	31,920	1.2	131,320	2.0
20 x 6	11,444	0.4	31,892	0.5
20 x 6.75 DC	1,889	0.1	5,611	0.1
21" Balloons				
21 x 2.75	52,449	2.0	72,643	0.8
21 x 3½	33,783	1.3	91,598	1.4
21 x 4	9,982	0.4	24,863	0.4
21 x 4½	1,351	0.0	11,465	0.2
21 x 5	.....	...	543	0.0
21 x 6	.....	...	1,017	0.0
22" Balloons				
22 x 4	151	0.0	501	0.0
High Pressure				
30 x 3½—23	.....	...	6,188	0.1
32 x 4½—23	1,359	0.1	16,085	0.2
32 x 4—24	440	0.0	6,816	0.1
34 x 4½—25	726	0.0	1,882	0.0
20" Truck				
30 x 5	355,111	13.6	916,006	13.7
32 x 6	56,210	2.2	120,237	1.8
34 x 7	22,226	0.9	44,817	0.7
36 x 8	19,866	0.8	40,955	0.6
40 x 10	.....	...	304	0.0
22" Truck				
36 x 7	173	0.0	173	0.0
38 x 8	789	0.0	1,337	0.0
24" Truck				
34 x 5	1,172	0.0	1,804	0.0
36 x 6	3,869	0.1	14,754	0.2
38 x 7	6,080	0.2	11,260	0.2
40 x 8	8,499	0.3	20,671	0.3
44 x 10	.....	...	246	0.0
Airplane				
8 x 3	131	0.0	146	0.0
12 x 3	76	0.0	208	0.0
18 x 3	29	0.0	29	0.0
16 x 3½ (24 x 4)	.....	...	954	0.0
20 x 3½	56	0.0	137	0.0
20 x 4	.....	...	6	0.0
20 x 5	209	0.0	211	0.0
20 x 6	23	0.0	357	0.0
20 x 8	7	0.0	396	0.0
24 x 10	.....	...	109	0.0
18 x 4 Cl	650	0.0	2,996	0.0
Totals	2,613,389	...	6,713,620	...

Cotton and Fabrics

AMERICAN COTTON. The price of spot middling cotton on March 1 was 20.70 cents compared with 20.75 cents on April 1. The price held above 20.00 cents for the first three weeks slowly declining all this time and reaching 19.85 cents on April 23.

It is assumed by experts that boll weevil infestation will be sufficient to threaten the crop with serious damage if weather or other conditions are favorable to weevil activity. It is estimated that this season's planted acreage will exceed that of last year by about three per cent. In general, the cotton crop is said to be making a favorable start, as good progress in planting is being made in the southern sections.

An order promulgating revised standards for American Egyptian cotton and for Upland cotton of Extra White color has been issued by the Secretary of Agriculture on April 19.

The full text of the department's statement follows:

A need for the new standards for American Egyptian cotton was found to exist, since changes in the color and preparation of the American Egyptian crop during recent years have been such that the present standards were no longer representative of American Egyptian cotton as now produced, according to the Bureau of Agricultural Economics, which administers the Cotton Standards Act.

The Extra White standards apply in the grade classification of Upland cotton, wherever grown. The Upland cottons, employing the term Upland in its accepted botanical sense, include all of the American commercial production of cotton except the American Egyptian and Sea Island types. As repromulgated the Extra White standards conform with the white grades in leaf and preparation and exemplify primarily the color differences.

The new standards, both American Egyptian and Extra White, will become officially effective August 1, 1930, but under the terms of the order of promulgation, they may be used meanwhile permissively in the purchase and sale of spot cottons of these descriptions, when specific reference is made to them in descriptions mutually agreed to by buyers and sellers.

Cotton Fabrics

DUCKS, DRILLS AND OSNABURGS. The active demand for these goods by rubber manufacturers is very well maintained. Inventories are reported light in jobbers' and consumers' hands. The outlook is excellent for active spring business and the fabric mills are well sold up.

SHEETINGS. The steady downward trend of the raw cotton market has influenced, to some degree, the buyers of sheetings. During the middle week of April, business transacted in print cloths and some sheeting numbers was very large. Aside from that, trade has been dull. There is no lessening of demands, but present inquiries are at figures slightly below sellers' prices which are firm.

RAINCOAT FABRICS. An improvement was noted during the last ten days of April which was due, doubtless, to the period of rainy weather then prevailing. Raincoat manufacturers are disposing of last season's left-over stocks and soon will be in the market for goods to develop new styles for the 1929 season.

TIRE FABRICS. The demand for tire fabrics in April was reported steady. American carded peeler seems to be favored over combed peeler or Egyptian grades. Tire fabric sales improved in volume as the month progressed, and tire manufacturers' interest increased in June-July goods. A check-up on orders thus far this year is reported to greatly exceed 3,500,000 pounds, and April sales are averaging equal to those of the months in the first quarter of the year.

New York Quotations

April 25, 1929

Drills

38-inch 2.00-yard	*yard*	$0.18 @
40-inch 3.47-yard		.10⅝@
50-inch 1.52-yard		.25⅛@
52-inch 1.90-yard		.20½@
52-inch 2.20-yard		.17⅞@
59-inch 1.85-yard		.21⅜@

Ducks

38-inch 2.00-yard D. F.	*yard*	.18¼@
40-inch 1.45-yard S. F.		.24⅞@
72-inch 1.05-yard D. F.		.38 @
72-inch 16.66-ounce		.40⅛@
72-inch 17.21-ounce		.41½@

MECHANICAL

Hose and belting	*pound*	@
Specials		@

TENNIS

52-inch 1.35-yard	*yard*	.27¼@

Hollands

R.T.5—30-inch	*yard*	.16 @
R.T.7—36-inch		.18 @
R.T.8—40-inch		.20 @
48A—32-inch		.12½@
48A—40-inch		.15½@

RED SEAL

36-inch		.15½@
40-inch		.16½@
50-inch		.25 @

GOLD SEAL

40-inch, No. 72		.20¾@
40-inch, No. 80		.22 @

Osnaburgs

40-inch 2.35-yard	*yard*	$0.15⅜@
40-inch 2.48-yard		.14½@
40-inch 3.00-yard		.12 @
40-inch 10-oz. part waste	*/b.*	*.17½@
40-inch 7-oz. part waste	*/b.*	*.12¼@
37-inch 2.42-yard		.14⅞@

* Net.

Raincoat Fabrics

COTTON

Bombazine 64 x 60	*yard*	.11 @
Bombazine 60 x 48		.10 @
Plaids 60 x 48		.12½@
Plaids 48 x 48		.11½@
Surface prints 64 x 60		.13½@
Surface prints 60 x 48		.12½@
Print cloth, 38½-in., 60 x 48		.06⅞@
Print cloth, 38½ in., 64 x 60.		.07⅝@

Sheetings, 40-inch

48 x 48, 2.50-yard	*yard*	.12¾@	
48 x 48, 2.85-yard		.11⅜@	.11¼
64 x 68, 3.15-yard		.11⅜@	.11⅞
56 x 60, 3.60-yard		.09⅝@	
44 x 48, 3.75-yard		.08½@	.08⅝
44 x 40, 4.25-yard		.07½@	

Sheetings, 36-inch

48 x 48, 5.00-yard	*yard*	.06¾@	.06⅞
40 x 44, 6.15-yard		.05⅝@	

Tire Fabrics

SQUARE WOVEN 17¼-ounce

Peeler, karded	*pound*	$0.47½@

BUILDER 23/11

Peeler, karded	*pound*	.47½@

BUILDER 10/5

Peeler, karded	*pound*	.44½@

CORD 23/5/3

Peeler, karded, 1 1/16-in.	*pound*	.47½@

CORD 23/4/3

Peeler, karded	*pound*	.49½@

CORD 23/5/3

Peeler, karded	*pound*	.50½@

CORD 15/3/5

Peeler, karded	*pound*	.45½@

CORD 13/3/3

Peeler, karded	*pound*	.44½@

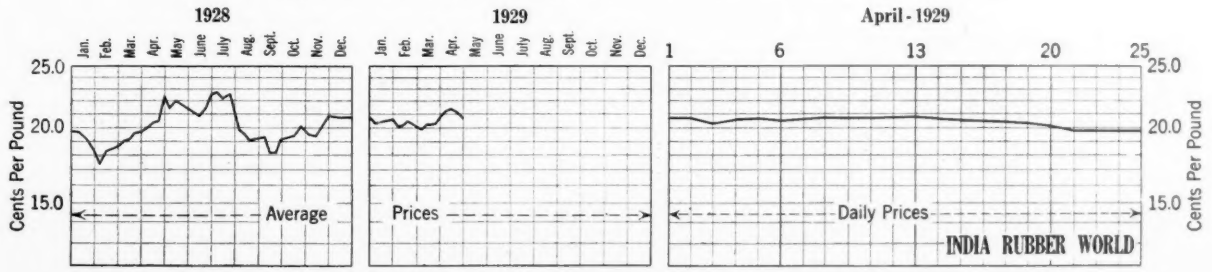
LENO BREAKER

8 oz. Peeler, karded	*pound*	.47½@
10-oz. Peeler, karded		.47½@

CHAFER

9.5-oz. Peeler, karded	*pound*	.47½@
12-oz. Peeler, karded		.47½@
14-oz. Peeler, karded		47½@

Ratio Graph of New York Daily Prices of Spot Middling Upland Cotton



World Rubber Absorption—Net Imports

	Total Jan.-Dec.		Long Tons—1929	
	1927	1928	Jan.	Feb.
Australia	9,490	8,430	1,061	1,131
Belgium	6,491	7,958	749	627
Canada	26,405	30,447	3,759	2,908
Czechoslovakia	2,715	3,138	.....	.....
Denmark	581	566	38	49
Finland	795	768	62	34
France	34,274	36,498	5,645	.....
Germany	38,892	37,855	4,711	4,613
Italy	11,381	12,433	1,481	1,259
Japan	20,521	25,621	3,776	.....
Netherlands	636	2,243	218	113
Norway	624	728	.....	.....
Russia	12,695	14,112	.....	.....
Spain	2,055	3,178	.....	.....
Sweden	2,225	2,356	468	95
United Kingdom	60,248	4,846	11,951	5,179
United States	398,453	404,496	53,922	61,331
U. S. (Guayule)	5,019	3,076	.....	.....
Totals	633,500	598,749	.....	.....

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

World Rubber Production—Net Exports

	Jan.-Dec,		Long Tons—1929		
British Malaya:	1927	1928	Jan.	Feb.	Mar.
Gross exports	371,513	409,500	52,546	47,926	49,448
Imports	182,843	149,787	13,415	12,103	14,553
Net	188,670	259,713	39,131	35,823	34,895
Ceylon	55,356	57,267	8,301	7,114	6,713
India and Burma	11,321	10,790	.....	.....	.....
Sarawak	10,923	10,087	873	955	758
B. N. Borneo	6,602	6,505	*500	500	*500
Siam	5,472	4,813	461	495	499
Java and Madura	55,297	58,848	5,640	6,572	.....
Sumatra East Coast	77,815	82,511	8,067	7,511	.....
Other N. E. Indies	142,171	121,770	11,076	10,384	.....
French Indo-China	8,645	9,542	395	965	741
Other America	2,454	1,490	.....	.....	.....
Amazon Valley	28,782	21,129	2,134	2,104	2,332
Mexican Guayule	5,019	3,076	.....	.....	.....
Africa	8,162	6,124	.....	.....	.....
Totals	606,689	653,665	.....	.....	.....

*Estimated.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Tire Production Statistics

United States tire manufacturers produced a total of 6,911,590 pneumatic casings during February, 1929. Total production of inner tubes is estimated at 6,769,140, and total production of solid and cushion tires at 40,281 for the month.

Total shipments during February are estimated as follows: pneumatic casings, all classes, 5,282,334; inner tubes, 5,277,676; solid and cushion tires, 42,538.

Inventories as of February 28, 1829, are estimated as 15,494,613 for all pneumatic casings 16,998,854 for inner tubes; and 196,220 for solid and cushion tires.

The tire industry is estimated to have consumed a total of 76,744,848 pounds of crude rubber, and 27,102,040 pounds of cotton fabric during February, in the manufacture of all types of pneumatic casings, inner tubes, and solid and cushion tires.

These estimates are based on reports furnished by manufacturers who produce approximately 75 per cent of the total for the United States.

	High Pressure Pneumatic Casings					
	All Types			Cord		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1928	.....	58,457,863	55,721,937	.....	19,302,218	19,351,380
1929						
January	10,284,158	5,041,530	4,969,647	3,651,041	1,563,554	1,461,104
February	11,620,960	5,183,693	3,961,751	4,073,644	1,373,691	974,185

	Balloon Casings			Solid and Cushion Tires		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1928	.....	38,878,218	35,931,982	.....	508,223	512,602
1929						
January	6,583,958	3,470,596	3,499.121	150,555	31,927	33,537
February	7,472,592	3,796,660	2,976,698	147,165	30,211	31,904

	High Pressure Inner Tubes			Balloon Inner Tubes		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1928	.....	23,255,891	23,749.966	.....	36,878,990	34,095,223
1929						
January	4,734,477	1,540,272	1,800,676	6,805,018	3,347,660	3,630,579
February	5,159,171	1,398.156	1,046,042	7,572,752	3,675,116	2,908,406

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires	
	Cotton Fabric Pounds	Crude Rubber Pounds
1928	222,243,398	600,423,401
1929		
January	19,779.481	54,160,520
February	20,326,530	57,558,636

Rubber Association figures representing 75 per cent of the industry.

Low and High New York Spot Prices

	1929*	April 1928	1927
PLANTATIONS			
First latex crepe	$0.20¼ @ $0.23½	$0.17 @ $0.27¾	$0.40¾ @ $0.41¾
Smoked sheet, ribbed	.19½ @ .23⅛	.16¾ @ .27½	.40½ @ .41½
PARAS			
Upriver, fine	.21¼ @ .23¾	.16¾ @ .24	.32¼ @ .33
Upriver, coarse	.12 @ .14	.13¾ @ .21	.24½ @ .26¼
Islands, fine	.19¼ @ .22	.....@.....	.28¼ @ .29¼

*Figured to April 24, 1929.

Dominion of Canada Statistics

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Twelve Months Ended December, 1927		Twelve Months Ended December, 1928	
UNMANUFACTURED	Pounds	Value	Pounds	Value
Rubber, gutta percha, etc.	59,253,424	$22,665,090	69,220,318	$18,059,287
Rubber recovered	9,748,000	974,229	357,416,300	1,160,430
Rubber and gutta percha scrap	8,229,400	517,573	8,369,000	352,513
Balata	6,176	2,933	21,135	9,536
Rubber substitutes	1,041,000	150,222	905,100	154,637
Totals	78,278,000	$24,310,047	435,931,853	$19,736,403
PARTLY MANUFACTURED				
Hard rubber sheets and rods	97,308	$48,291	56,583	$36,924
Hard rubber tubes	.....	12,620	.....	15,778
Rubber thread not covered	220,584	287,118	227,489	251,948
Totals	317,892	$348,029	284,072	$304,650
MANUFACTURED				
Belting	.....	$130,989	.....	$184,010
Hose	.....	172,732	.....	228,624
Packing	.....	52,901	.....	62,751
Boots and shoes, *pairs*	110,488	202,801	181,011	229,553
Clothing, including waterproofed	.....	482,461	.....	576,566
Elastic, round or flat	.....	188,779	.....	*32,207
Gloves	.....	18,236	.....	19,581
Hot water bottles	.....	27,104	.....	31,235
Tires, solid, *number*	491	27,873	.....	39,314
Tires, pneumatic, *number*	46,042	292,354	.....	241,208
Tires, tubes, *number*	44,144	88,71[illegible]	.....	49,276
Mats and matting	.....	31,29[illegible]	.....	122,790
Cement	.....	88.85	.....	78,014
Golf balls, *dozen*	47,547	192,660	30,663	117,653
Heels rubber, *pairs*	900,432	52,849	1,537,056	95,720
Other rubber manufactures	.....	1,278,420	.....	1,461,988
Totals	.....	$3,329,014	.....	$3,570,490
Totals, rubber imports	.....	$27,987,090	.....	$23,611,543

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	Produce of Canada Value	Re-exports of Foreign Goods Value	Produce of Canada Value	Re-exports of Foreign Goods Value
UNMANUFACTURED				
Waste rubber	$273,639	.....	$263,967	.....
Totals	$273,639	.....	$263,967	.....
MANUFACTURED				
Belting	$500,935	.....	$470,902	.....
Canvas shoes with rubber soles	3,835,443	.....	5,092,198	.....
Boots and shoes	1,865,672	.....	3,509,660	.....
Clothing, including waterproofed	24,164	.....	28,759	.....
Hose	256,696	.....	257,115	.....
Tires, casings	16,919,950	.....	16,741,116	.....
Inner tubes	3,143,901	.....	2,605,729	.....
Solid	438,926	.....	361,547	.....
Other rubber manufactures	748,491	$66,615	1,362.468	$84,738
Totals	$27,734,178	$66,615	$30,429,495	$84,738
Totals, rubber exports	$28,007,817	$66,615	$30,693,462	$84,738

*January 1 to March 31, 1928.

R & H 397 IS AN ECONOMICAL, ULTRA ACCELERATOR, ACTIVE AT all temperatures above 100° C. It is a white, free flowing powder, non-hygroscopic, melting at about 100° C. In chemical composition, it belongs to the thiuram class and can be used wherever rapid or low temperature cures are desired. It is also a good auxiliary accelerator to be used in very small proportions when used in conjunction with other less rapid accelerators.

United States Statistics

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	January, 1929		Six Months Ended December, 1928	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	128,944,431	$22,872,943	*507,393,785	*$94,242,675
Liquid latex	47,493	8,907	.....	.....
Balata	102,554	30,374	1,152,126	279,615
Jelutong or Pontianak	1,084,422	152,260	9,346,074	1,335,540
Gutta percha	309,532	62,950	1,845,937	334,740
Guayule	.....	.....	428,767	100,498
Siak, Scrap and reclaimed	1,940,930	42,149	10,211,710	251,810
Totals	132,429,362	$23,169,583	530,378,399	$96,544,878
Chicle *dutiable*	1,166,167	574,096	3,502,160	1,731,882
MANUFACTURED—*Dutiable*				
Rubber belting	1,177	$879	257,885	$148,026
Rubber tires	21	522	1,554	12,644
Other manufactures of rubber	.....	212,713	.....	836,183
Totals	1,198	$214,114	259,439	$996,853

EXPORTS OF FOREIGN MERCHANDISE

RUBBER MANUFACTURES				
Crude rubber	8,205,861	$1,773,401	36,786,566	$7,374,720
Balata	33,793	13,310	197,181	62,554
Gutta percha, rubber substitutes and scrap	22,473	4,045	21,258	3,996
Rubber manufactures	.....	4,785	.....	56,531
Totals	8,262,127	$1,795,541	37,005,005	$7,497,801

EXPORTS OF DOMESTIC MERCHANDISE

MANUFACTURED				
Reclaimed	2,107,870	$139,395	11,085,266	$799,817
Scrap and old	4,283,318	188,506	22,774,680	1,052,224
Rubberized automobile cloth, *sq. yd.*	186,107	98,270	.....	.....
Other rubberized piece goods and hospital sheeting, *sq. yd.*	152,997	73,730	797,359	381,895
Footwear				
Boots *pairs*	96,540	203,760	906,744	1,935,124
Shoes *pairs*	169,121	152,039	1,713,195	2,063,185
Canvas shoes with rubber soles *pairs*	621,068	389,002	2,617,732	1,773,624
Rubber soles and heels, *doz. pairs*	.....	.....	699,608	731,513
Rubber soles *doz. pairs*	17,337	40,444	.....	.....
Rubber heels *doz. pairs*	133,074	107,362	.....	.....
Rubber water bottles and fountain syringes *number*	43,369	29,878	213,780	132,300
Rubber gloves *doz. pairs*	6,923	18,768	45,936	136,722
Other druggists' rubber sundries	.....	40,471	.....	239,436
Rubber balloons *gross*	62,348	65,761	337,253	415,949
Rubber toys [illegible]	.....	11,859	.....	111,289
Bathing caps *doz.*	7,260	22,387	43,701	111,246
Rubber bands [illegible]	.....	.....	443,768	279,647
Rubber bands	52,095	27,355	.....	.....
Rubber erasers	46,434	29,307	.....	.....
Hard rubber goods				
Electrical hard goods	125,036	17,116	975,473	183,304
Other hard rubber goods	.....	39,115	.....	179,226
Tires				
Casings, auto *number*	289,838	3,290,544	1,285,873	15,493,124
Truck and bus casings, 6 inches and over, *number*	26,527	618,851	.....	.....
Other automobile casings *number*	263,311	2,671,693	.....	.....
Tubes, auto *number*	200,319	328,937	850,414	1,785,256
Other casings and tubes *number*	21,977	62,400	33,553	67,551
Solid tires for automobiles and motor trucks, *number*	4,509	139,141	29,117	832,657
Others	121,157	25,190	784,231	156,607
Tire accessories	.....	129,758	.....	741,160
Rubber and friction tape	147,519	46,787	866,804	257,589
Belting	437,107	231,400	2,416,101	1,389,631
Hose	749,128	256,076	3,636,663	1,300,930
Packing	235,452	105,352	1,147,818	557,951
Thread	95,952	106,989	812,019	876,508
Other rubber manufactures	.....	354,503	.....	1,344,589
Totals	.....	$10,062,146	.....	$35,330,054

*Liquid latex included.

London Stocks, February, 1929

	Landed for Feb. Tons	Delivered for Feb. Tons	Stocked February 28		
			1929 Tons	1928 Tons	1927 Tons
LONDON					
Plantation	6,725	6,355	25,439	62,827	58,622
Other grades	.....	.....	75	89	126
LIVERPOOL					
Plantation	†1,157	†827	†4,105	†2,343	†2,344
Total tons, London and Liverpool	7,882	7,182	29,619	65,259	61,092

†Official returns from the seven recognized public warehouses.

United Kingdom Statistics

IMPORTS

	February, 1929		Two Months Ended February, 1929	
	Pounds	Value	Pounds	Value
UNMANUFACTURED				
Crude Rubber				
From—				
Straits Settlements	8,528,300	£373,182	29,056,500	£1,148,861
Federated Malay States	4,335,600	201,576	12,641,500	520,844
British India	1,227,500	57,982	2,631,600	114,894
Ceylon and Dependencies	3,004,300	139,887	7,091,800	302,296
Other Dutch possessions in Indian Seas	1,329,500	59,587	3,572,000	148,141
Dutch East Indies (except other Dutch possessions in Indian Seas)	1,329,500	59,587	2,572,000	148,141
Other countries in East Indies and Pacific not elsewhere specified	168,400	7,663	315,400	13,146
Brazil	590,700	28,238	1,801,500	77,239
South and Central America (except Brazil)	.....	.....	23,500	815
West Africa				
French West Africa	200	6	200	6
Gold Coast	29,000	1,095	64,100	2,463
Other parts of West Africa	138,800	6,232	447,800	17,826
East Africa, including Madagascar	26,000	1,179	159,800	6,752
Other countries	51,300	2,590	188,900	7,757
Totals	20,373,600	£922,475	62,379,000	£2,548,916
Gutta percha and balata	315,400	20,833	1,220,100	86,956
Waste and reclaimed rubber	802,600	8,686	1,703,200	18,229
Rubber substitutes	.....	.....	14,400	307
Totals	21,491,600	£951,994	65,316,700	£2,654,408
MANUFACTURED				
*††Tires and tubes				
Pneumatic				
Outer covers	.....	£41,239	.....	£94,978
Inner tubes	.....	7,748	.....	15,226
Solid tires	.....	7,216	.....	13,519
Boots and shoes *doz. pairs*	64,395	84,291	151,370	200,633
Other rubber manufactures	.....	131,607	.....	303,464
Totals	.....	£272,101	.....	£627,820

EXPORTS

UNMANUFACTURED				
Waste and reclaimed rubber	2,580,000	£21,254	6,278,100	£45,090
Rubber substitutes	76,400	1,433	113,900	2,255
Totals	2,656,400	£22,687	6,392,000	£47,345
MANUFACTURED				
‡Tires and tubes				
Pneumatic				
Outer covers	.....	£224,300	.....	£474,907
Inner tubes	.....	41,053	.....	78,408
Solid tires	.....	10,634	.....	26,725
Boots and shoes *doz. pairs*	19,243	31,141	39,018	67,995
Other rubber manufactures	.....	197,957	.....	452,553
Totals	.....	£505,085	.....	£1,100,588

EXPORTS—COLONIAL AND FOREIGN

UNMANUFACTURED				
Crude Rubber				
To—				
Russia	1,167,900	£47,172	1,291,300	£51,859
Sweden, Norway and Denmark	168,200	7,285	519,900	22,257
Germany	2,168,600	89,714	5,924,600	229,684
Belgium	580,100	24,208	1,795,800	72,640
France	2,623,200	119,451	7,758,600	314,322
Spain	222,300	11,457	550,900	23,909
Italy	466,100	26,699	1,624,800	77,620
Other European countries	341,500	15,867	1,211,600	47,555
United States	838,100	38,933	2,976,100	120,853
Other countries	197,500	9,804	356,000	17,697
Totals	8,773,500	£390,590	24,009,600	£978,396
Gutta percha and balata	88,400	5,681	307,500	18,816
Waste and reclaimed rubber	36,600	676	87,200	1,239
Rubber substitutes	700	38	700	33
Totals	8,899,200	£396,985	24,405,000	£998,489
MANUFACTURED				
*‡Tires and tubes				
Pneumatic				
Outer covers	.....	£7,677	.....	£15,549
Inner tubes	.....	1,589	.....	2,338
Solid tires	.....	20	.....	386
Boots and shoes *doz. pairs*	666	1,890	1,607	4,330
Other rubber manufactures	.....	5,175	.....	12,550
Totals	.....	£16,351	.....	£35,153

*After April 12, 1927, tires and tubes imported or exported with complete vehicles or chassis, or fitted to wheels imported separately, are included under complete vehicles or parts.

†Motor cars, motorcycles, parts and accessories, liable to duty from Sept. 29, 1915, until Aug. 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts and accessories were exempt from duty until Apr. 30, 1926, inclusive, and rubber tires and tubes until Apr. 11, 1927, inclusive.

‡Tires and tubes included prior to Apr. 12, 1927.

Crude Rubber Arrivals at New York as Reported by Importers

Plantations

	Cases
FEB. 18. By "Memphis City," Far East.	
General Rubber Co	6,043
MAR. 16. By "Fairfield City," Far East.	
General Rubber Co	8,836
Poel & Kelly, Inc	*55
Raw Products Co	400
Chas. T. Wilson Co., Inc	425
MAR. 16. By "Silverhazel," Far East.	
Robert Badenhop Corp	1,482
Baird Rubber & Trading Co., Inc	480
Baird Rubber & Trading Co., Inc	*150
Bierrie & Co., Inc	665
General Rubber Co	12,364
Haldane & Co., Inc	250
B. W. Henderson & Co., Inc	300
Hood Rubber Co	*111
Lavino American & Asiatic Co	820
Littlejohn & Co., Inc	4,967
The Meyer & Brown Corp	924
H. Muehlstein & Co., Inc	1,129
Poel & Kelly, Inc	2,757
Raw Products Co	896
Rogers Brown & Crocker Bros., Inc	1,568
Chas. T. Wilson Co., Inc	2,373
MAR. 18. By "City of Chester," Far East.	
Robert Badenhop Corp.....pkgs.	505
Baird Rubber & Trading Co., Inc	100
Bierrie & Co., Inc	400
General Rubber Co	3,058
Haldane & Co., Inc	382
B. W. Henderson & Co., Inc	125
Littlejohn & Co., Inc	5,825
The Meyer & Brown Corp	2,035
H. Muehlstein & Co., Inc	750
Poel & Kelly, Inc	715
Poel & Kelly, Inc	*260
Raw Products Co	200
Rogers Brown & Crocker Bros., Inc	461
Chas. T. Wilson Co., Inc	485
MAR. 18. By "Levernbank," Far East.	
H. A. Astlett & Co	2,050
Robert Badenhop Corp.....bales	60
Baird Rubber & Trading Co., Inc	500
Paul Bertuch & Co., Inc	100
Bierrie & Co., Inc	540
N. Diamond & Co., Inc	370
General Rubber Co	6,718
Haldane & Co., Inc	200
B. W. Henderson & Co., Inc	450
Littlejohn & Co., Inc	1,823
The Meyer & Brown Corp	2,258
The Meyer & Brown Corp	*450
H. Muehlstein & Co., Inc	910
Poel & Kelly, Inc	810
Poel & Kelly, Inc	*150
Raw Products Co	119
Rogers Brown & Crocker Bros., Inc	490
Rogers Brown & Crocker Bros., Inc	*140
Chas. T. Wilson Co., Inc	350
MAR. 18. By "Mahanada," Far East.	
Bierrie & Co., Inc	148
General Rubber Co	1,831
Littlejohn & Co., Inc	140
The Meyer & Brown Corp	2,106
Poel & Kelly, Inc	250
MAR. 18. By "Silvercedar," Far East.	
The Meyer & Brown Corp	†150
MAR. 19. By "Breedyk," Far East.	
H. A. Astlett & Co	1,430
Robert Badenhop Corp	100
Bierrie & Co., Inc	284
N. Diamond & Co., Inc	100
General Rubber Co	5,685
B. W. Henderson & Co., Inc	57
Lavino American & Asiatic Co	272
Littlejohn & Co., Inc	330
The Meyer & Brown Corp	750
Poel & Kelly, Inc	50
Raw Products Co	51
Rogers Brown & Crocker Bros., Inc	1,015
Rogers Brown & Crocker Bros., Inc	*168
Chas. T. Wilson Co., Inc	345
MAR. 20. By "Pres. Hayes," Far East.	
H. A. Astlett & Co	2,200
Robert Badenhop Corp.....pkgs.	785
Baird Rubber & Trading Co., Inc	973
Baird Rubber & Trading Co., Inc	*50
Bierrie & Co., Inc	326
N. Diamond & Co., Inc	54
General Rubber Co	7,372
Haldane & Co., Inc	625
Hood Rubber Co	*33
Lavino American & Asiatic Co	752
Littlejohn & Co., Inc	1,655
The Meyer & Brown Corp	3,031
The Meyer & Brown Corp	*170
H. Muehlstein & Co., Inc	390
Poel & Kelly, Inc	885
Poel & Kelly, Inc	*100
Raw Products Co	230
Rogers Brown & Crocker Bros., Inc	883
Rogers Brown & Crocker Bros., Inc	*200
Chas. T. Wilson Co., Inc	885
MAR. 21. By "Harburg," Far East.	
Hood Rubber Co	*480
MAR. 21. By "Memnon," Far East.	
B. W. Henderson & Co., Inc	211
MAR. 22. By "Blitar," Far East.	
B. W. Henderson & Co., Inc	150
MAR. 22. By "City of Adelaide," Far East.	
B. W. Henderson & Co., Inc	50
MAR. 23. By "Springbank," Far East.	
H. A. Astlett & Co	670
Robert Badenhop Corp	160
Baird Rubber & Trading Co., Inc	77
Baird Rubber & Trading Co., Inc	*330
Bierrie & Co., Inc	442
General Rubber Co	1,104
Haldane & Co., Inc	300
Littlejohn & Co., Inc	2,256
The Meyer & Brown Corp	1,326
H. Muehlstein & Co., Inc	1,350
Poel & Kelly, Inc	35
Rogers Brown & Crocker Bros., Inc	162
Chas. T. Wilson Co., Inc	697
MAR. 24. By "Examelia," Far East.	
H. A. Astlett & Co	160
MAR. 25. By "City of Evansville," Far East.	
H. A. Astlett & Co	112
Baird Rubber & Trading Co., Inc	46
Bierrie & Co., Inc	270
General Rubber Co	744
Haldane & Co., Inc	290
B. W. Henderson & Co., Inc	14
Littlejohn & Co., Inc	607
The Meyer & Brown Corp	265
Rogers Brown & Crocker Bros., Inc	215
Chas. T. Wilson Co., Inc	324
MAR. 25. By "Minnetonka," London.	
Chas. T. Wilson Co., Inc	85
MAR. 25. By "Pres. Pierce," Far East.	
H. A. Astlett & Co	657
Littlejohn & Co., Inc	†386
MAR. 26. By "American Shipper," Europe.	
General Rubber Co	30
The Meyer & Brown Corp	105
Rogers Brown & Crocker Bros., Inc	50
MAR. 27. By "Cedric," London.	
Chas. T. Wilson Co., Inc	26
MAR. 27. By "Palembang," Far East.	
H. A. Astlett & Co	2,003
Robert Badenhop Corp	644
Baird Rubber & Trading Co., Inc	357
Bierrie & Co., Inc	1,133
N. Diamond & Co., Inc	30
General Rubber Co	7,851
Haldane & Co., Inc	168
B. W. Henderson & Co., Inc	56
Hood Rubber Co	*145
Lavino American & Asiatic Co	811
Littlejohn & Co., Inc	1,398
The Meyer & Brown Corp	3,837
The Meyer & Brown Corp	*135
H. Muehlstein & Co., Inc	980
Poel & Kelly, Inc	579
Raw Products Co	116
Rogers Brown & Crocker Bros., Inc	287
Chas. T. Wilson Co., Inc	710
MAR. 27. By "Ryndam," Europe.	
Robert Badenhop Corp.....bags	195
MAR. 28. By "Lowther Castle," Far East.	
H. A. Astlett & Co	4,937
Baird Rubber & Trading Co., Inc	2,258
Bierrie & Co., Inc	668
General Rubber Co	8,083
Haldane & Co., Inc	780
B. W. Henderson & Co., Inc	450
Hood Rubber Co	67
Littlejohn & Co., Inc	3,328
The Meyer & Brown Corp	2,160
H. Muehlstein & Co., Inc	956
Poel & Kelly, Inc	1,490
Poel & Kelly, Inc	*350
Raw Products Co	400
Rogers Brown & Crocker Bros., Inc	500
Chas. T. Wilson Co., Inc	1,890
MAR. 28. By "Stockwell," Far East.	
Robert Badenhop Corp	221
General Rubber Co	2,802
Haldane & Co., Inc	224
Littlejohn & Co., Inc	896
The Meyer & Brown Corp	1,086
H. Muehlstein & Co., Inc	610
Rogers Brown & Crocker Bros., Inc	56
Chas. T. Wilson Co., Inc	173
MAR. 29. By "Javanese Prince," Far East.	
H. A. Astlett & Co	3,335
Baird Rubber & Trading Co., Inc	870
Bierrie & Co., Inc	500
N. Diamond & Co., Inc	56
General Rubber Co	12,127
Haldane & Co., Inc	250
B. W. Henderson & Co., Inc	436
Lavino American & Asiatic Co	50
Littlejohn & Co., Inc	6,446
The Meyer & Brown Corp	875
H. Muehlstein & Co., Inc	1,325
Poel & Kelly, Inc	800
Raw Products Co	331
Rogers Brown & Crocker Bros., Inc	1,732
Chas. T. Wilson & Co., Inc	2,835
APR. 1. By "Silverash," Far East.	
H. A. Astlett & Co	2,730
Robert Badenhop Corp.....pkgs.	1,143
Baird Rubber & Trading Co., Inc	1,050
Bierrie & Co., Inc	589
General Rubber Co	11,322
Haldane & Co., Inc	420
Littlejohn & Co., Inc	3,107
The Meyer & Brown Corp	1,800
The Meyer & Brown Corp	*503
H. Muehlstein & Co., Inc	1,841
Poel & Kelly, Inc	260
Raw Products Co	260
Rogers Brown & Crocker Bros., Inc	1,409
Rogers Brown & Crocker Bros., Inc	*168
Chas. T. Wilson Co., Inc	1,945
APR. 2. By "Bengkalis," Far East.	
The Meyer & Brown Corp	†165
H. Muehlstein & Co., Inc	†850
APR. 2. By "Pres. Polk," Far East.	
H. A. Astlett & Co	1,050
Robert Badenhop Corp.....pkgs.	1,675
Baird Rubber & Trading Co., Inc	362
Bierrie & Co., Inc	256
N. Diamond & Co., Inc	70
General Rubber Co	6,254
Littlejohn & Co., Inc	2,455
The Meyer & Brown Corp	1,420
Poel & Kelly, Inc	1,280
Raw Products Co	250
Rogers Brown & Crocker Bros., Inc	1,130
Rogers Brown & Crocker Bros., Inc	*100
Chas. T. Wilson Co., Inc	728
APR. 2. By "Siberia Maru," Far East.	
The Meyer & Brown Corp	†100
APR. 3. By "Kentucky," Far East.	
Littlejohn & Co., Inc	†55
APR. 4 By "Autolycus," Far East.	
H. A. Astlett & Co	3,093
Robert Badenhop Corp.....pkgs.	405
Baird Rubber & Trading Co., Inc	1,746
Baird Rubber & Trading Co., Inc	*50
Bierrie & Co., Inc	528
N. Diamond & Co., Inc	380
General Rubber Co	13,847
Haldane & Co., Inc	306
Lavino American & Asiatic Co	695
Littlejohn & Co., Inc	4,014
The Meyer & Brown Corp	2,438
The Meyer & Brown Corp	*55
H. Muehlstein & Co., Inc	2,450
Poel & Kelly, Inc	1,693
Raw Products Co	100
Rogers Brown & Crocker Bros., Inc	1,868
Chas. T. Wilson Co., Inc	701
APR. 4. By "Bessemer City," Far East.	
H. A. Astlett & Co	2,180
Robert Badenhop Corp	600
Baird Rubber & Trading Co., Inc	2,050
Bierrie & Co., Inc	750
General Rubber Co	7,911
Haldane & Co., Inc	470
B. W. Henderson & Co., Inc	200
Littlejohn & Co., Inc	1,235
The Meyer & Brown Corp	1,940
Poel & Kelly, Inc	1,205
Rogers Brown & Crocker Bros., Inc	370
Chas. T. Wilson Co., Inc	430

*Arrived at Boston.
†Arrived at Los Angeles.

	Cases
Apr. 5. By "City of Batavia," Far East.	
H. A. Astlett & Co.	5,234
Robert Badenhop Corp.....pkgs.	2,300
Baird Rubber & Trading Co., Inc.	1,630
Bierrie & Co., Inc.	1,365
General Rubber Co.	12,194
Haldane & Co., Inc.	286
Lavino American & Asiatic Co.	280
Littlejohn & Co., Inc.	7,490
The Meyer & Brown Corp.	3,220
The Meyer & Brown Corp.	*180
H. Muehlstein & Co., Inc.	510
Poel & Kelly, Inc.	605
Raw Products Co.	390
Rogers Brown & Crocker Bros., Inc.	1,630
Rogers Brown & Crocker Bros., Inc.	*150
Chas. T. Wilson Co., Inc.	1,290
Apr. 8. By "Ansonia," Far East.	
General Rubber Co.	400
Apr. 8. By "Minnewaska," Europe.	
General Rubber Co.	55
Lavino American & Asiatic Co.	120
Chas. T. Wilson Co., Inc.	290
Apr. 8. By "Muncaster Castle," Far East.	
H. A. Astlett & Co.	3,410
Robert Badenhop Corp.....pkgs.	455
Baird Rubber & Trading Co., Inc.	2,125
Bierrie & Co., Inc.	550
N. Diamond & Co., Inc.	250
General Rubber Co.	8,468
Haldane & Co., Inc.	250
Littlejohn & Co., Inc.	3,104
The Meyer & Brown Corp.	1,571
The Meyer & Brown Corp.	*55
H. Muehlstein & Co., Inc.	1,240
Poel & Kelly, Inc.	1,676
Poel & Kelly, Inc.	*250
Raw Products Co.	250
Rogers Brown & Crocker Bros., Inc.	460
Rogers Brown & Crocker Bros., Inc.	*96
Apr. 8. By "Walton Hall," Far East.	
H. A. Astlett & Co.	224
Robert Badenhop Corp.	165
Bierrie & Co., Inc.	336
General Rubber Co.	1,236
Littlejohn & Co., Inc.	968
The Meyer & Brown Corp.	530
Chas. T. Wilson Co., Inc.	112

*Arrived at Boston.
†Arrived at Los Angeles.

	Cases
Apr. 9. By "Bentang," Far East.	
The Meyer & Brown Corp.	†150
H. Muehlstein & Co., Inc.	1,350
Apr. 9. By "Steel Traveler," Far East.	
H. A. Astlett & Co.	2,180
Robert Badenhop Corp.	1,402
Baird Rubber & Trading Co., Inc.	400
Bierrie & Co., Inc.	440
General Rubber Co.	9,242
Haldane & Co., Inc.	236
Littlejohn & Co., Inc.	2,677
The Meyer & Brown Corp.	1,401
H. Muehlstein & Co., Inc.	1,850
Poel & Kelly, Inc.	650
Raw Products Co.	480
Rogers Brown & Crocker Bros., Inc.	600
Rogers Brown & Crocker Bros., Inc.	*250
Chas. T. Wilson Co., Inc.	390
Apr. 10. By "City of Salisbury," Far East.	
H. A. Astlett & Co.	200
Robert Badenhop Corp.	256
Baird Rubber & Trading Co., Inc.	112
Baird Rubber & Trading Co., Inc.	*66
Bierrie & Co., Inc.	168
General Rubber Co.	2,035
Littlejohn & Co., Inc.	825
The Meyer & Brown Corp.	2,869
The Meyer & Brown Corp.	*320
H. Muehlstein & Co., Inc.	320
Raw Products Co.	198
Chas. T. Wilson Co., Inc.	350
Apr. 11. By "Liguria," Far East.	
Hood Rubber Co.	*640
Apr. 11. By "Mahratta," Far East.	
Robert Badenhop Corp.	112
Bierrie & Co., Inc.	56
General Rubber Co.	5,008
The Meyer & Brown Corp.	1,296
H. Muehlstein & Co., Inc.	320
Raw Products Co.	200
Apr. 12. By "Wray Castle," Far East.	
H. A. Astlett & Co.	720
Robert Badenhop Corp.....pkgs.	412
Baird Rubber & Trading Co., Inc.	1,400
Bierrie & Co., Inc.	200
General Rubber Co.	10,843
Littlejohn & Co., Inc.	1,100
The Meyer & Brown Corp.	1,875
The Meyer & Brown Corp.	*662

	Cases
H. Muehlstein & Co., Inc.	2,350
Poel & Kelly, Inc.	2,090
Poel & Kelly, Inc.	*400
Raw Products Co.	5,095
Rogers Brown & Crocker Bros., Inc.	970
Chas. T. Wilson Co., Inc.	135
Apr. 13. By "Roxen," Far East.	
H. A. Astlett & Co.	†560
Littlejohn & Co., Inc.	†560
H. Muehlstein & Co., Inc.	†950
Apr. 13. By "Silverfir," Far East.	
The Meyer & Brown Corp.	†450
Apr. 15. By "City of Bedford," Far East.	
Robert Badenhop Corp.	1,139

Balata

Mar. 21. By "Haiti," Paramaribo.	
Middleton & Co., Ltd.....bales	37
Mar. 28. By "Sheridan," South America.	
Paul Bertuch & Co., Ltd.	36
General Rubber Co.	25
Apr. 10. By "Justin," South America.	
Paul Bertuch & Co., Inc.	17

Rubber Latex

Feb. 18. By "Memphis City," Far East.	
General Rubber Co.....gals.	64,979
Mar. 16. By "Fairfield City," Far East.	
General Rubber Co.....gals.	62,941
Mar. 16. By "Silverhazel," Far East.	
General Rubber Co.....gals.	64,623
Apr. 1. By "Silverash," Far East.	
General Rubber Co.....gals.	64,324
Apr. 4. By "Bessemer City," Far East.	
General Rubber Co.....gals.	35,121
Apr. 8. By "Muncaster Castle," Far East.	
General Rubber Co.....gals.	34,272
Apr. 9. By "Steel Traveler," Far East.	
General Rubber Co.....gals.	63,608

Paras and Caucho

	Fine Cases	Medium Cases	Coarse Cases	Caucho Cases	Miscel. Cases
Mar. 15. By "Francis," South America.					
H. A. Astlett & Co.	65	....	....	....	....
Mar. 16. By "Barreado," South America.					
H. A. Astlett & Co.	179	....	70	146	....
Paul Bertuch & Co., Inc.	....	....	146	....	....
Mar. 25. By "Berury," South America.					
H. A. Astlett & Co.	....	....	73	....	....
Paul Bertuch & Co., Inc.	325	....	....	....	....
Littlejohn & Co., Inc.	93	....	....	....	....
The Meyer & Brown Corp.	612	....	....	....	....
Mar. 28. By "Sheridan," South America.					
H. A. Astlett & Co.	129	2	93	77	....
Paul Bertuch & Co., Inc.	124	....	....	....	....
General Rubber Co.	374	10	85	37	8
Littlejohn & Co., Inc.	465	....	....	100	....
The Meyer & Brown Corp.	302	....	....	....	....
Apr. 10. By "Justin," South America.					
General Rubber Co.	251	2	88	....	3
Littlejohn & Co., Inc.	13	....	....	....	....
The Meyer & Brown Corp.	75	....	....	....	....

United States Crude and Waste Rubber Imports for 1929 by Months

	Plantations	Paras	Africans	Centrals	Guayule	Manicobas and Matto Grosso	Total 1929	Total 1928	Balata	Miscellaneous	Waste
January ..... *tons*	51,202	1,055	30	5	...	13	52,305	46,243	67	799	181
February	63,851	530	60	97	...	..	64,538	29,445	80	1,220	319
March	51,661	2,112	15	36	...	..	53,824	40,894	85	825	70
Total three months, 1929..... *tons*	166,714	3,697	105	138	...	13	170,667	.....	232	2,844	570
Total three months, 1928..... *tons*	109,065	4,766	630	343	1,777	1	.....	116,582	332	2,550	1,388

Compiled from Rubber Association statistics.

Plantation Rubber Exports from Malaya*

January 1 to January 31, 1929

	From Singapore Tons	From Penang Tons	From Malacca Tons
To United Kingdom	367.00	801.00	738.00
British Possessions	398.00	60.00	2.00
Continent of Europe	2,417.00	904.00	634.00
United States	18,442.00	5,211.00	2,233.00
Japan	2,073.00	.....	116.00
Other countries	67.00	.....	.....
Totals	23,764.00	6,976.00	3,723.00

*Excluding all foreign transhipment.

Crude Rubber Imports by Customs Districts

	*February, 1929 Pounds	*February, 1929 Value	Two Months Ended *February, 1929 Pounds	Two Months Ended *February, 1929 Value
Massachusetts	3,376,373	$573,808	7,864,642	$1,316,190
New York.....	127,029,040	21,778,103	235,641,925	41,221,846
Philadelphia	584,562	95,912	875,330	146,381
Maryland	4,674,423	857,474	6,328,790	1,134,746
Los Angeles	5,215,335	933,080	13,224,174	2,304,108
San Francisco....	121,114	29,079	281,279	61,467
Oregon	22,400	3,887	33,600	5,738
Ohio	2,697,497	441,894	8,195,731	1,357,727
Colorado	280,000	56,328	537,600	99,291
Totals	144,000,744	$24,769,565	272,983,071	$47,647,494

*Including latex, dry rubber content.

Imports, Consumption and Stocks

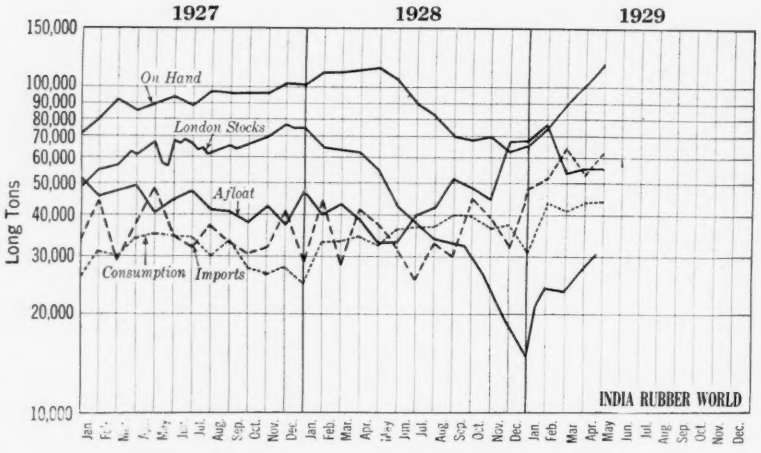
The accompanying graph covers crude rubber importations, consumption and stocks by months for the years 1927 to 1928, inclusive, and for January, February, March and April of 1929. The figures for April are estimated.

The corrected imports for March totaled 53,824 tons or 3,824 tons over the estimated amount.

The corrected consumption for March was 44,730 tons or 1,270 less than estimated.

April estimated imports are placed at 62,000 tons. The other estimates for April are: consumption 43,000 tons, on hand 119,537 tons, and afloat 55,000 tons.

London stocks continue to increase and since January 1 have risen from about 25,000 tons to 30,503 tons on April 20.



United States Imports, Consumption and Stocks

The following is the weekly record of London stock movement from March 30 to April 20, inclusive: March 30, 28,077 tons; April 6, 28,934 tons; April 13, 30,446 tons; April 20, 30,503 tons.

Twelve Months	Imports Tons	Consumption Tons	Stocks On Hand Tons	Stocks Afloat Tons	London Tons	Singapore and Penang Tons
1925.....	384,837	389,136	51,000*	48,000*	.....	.....
1926.....	411,900	366,140	72,510*	52,019*	.....	.....
1927.....	426,258	370,915	109,130*	47,939*	63,207*	25,868*
1928.....	448,378	441,336	66,166*	68,764*	24,423†	34,432*
1929						
January.....	52,305	43,000	76,342	78,596	24,423	33,119
February.....	64,528	41,594	90,058	53,825	25,000	.....
March	53,824	44,730	100,537	56,476	28,077	33,784
April (est.)...	62,000	43,000	119,537	55,000	.....	.....

*December 31. †January 26.

The 1928 figures, unless otherwise specified, are all as of the first of each month.

Ceylon Rubber Exports

January 1 to January 31, 1929

	Tons
To United Kingdom	1,744.14
Continent	670.08
Australia	265.66
America	5,561.06
Egypt	1.00
Africa	—.48
India	4.51
Japan	23.00
Total	8,269.93
For the same period last year	4,345.23

Annual Exports, 1921-1928

	Tons
For the year 1928	57,825.48
1927	55,355.77
1926	58,799.56
1925	45,697.19
1924	37,351.13
1923	37,111.88
1922	47,367.14
1921	40,210.31

Ureka

Ureka is a new type of delayed action accelerator recently developed. The delayed action is due to the fact that a delay of a certain time at a given temperature is required before the material becomes active as an accelerator. This permits handling of faster curing stocks on the mills, calenders, and tubing machines without scorching. Ureka has the advantage in this respect because of its unusual curing range, which extends from 20 to 60 pounds of steam. It is thus satisfactory for use in all types of stock, such as tires, tubes, shoes, mechanical goods, druggists' sundries, etc. It turns stocks slightly yellow, therefore cannot be used in white compounds but is excellent for all colored stocks.

In tires it gives excellent cures, satisfactory aging, and very good abrasive wear resistance. One of its outstanding advances in tread stocks is that it does not require much stearic acid to activate it. Stearic acid should be retained in the formula, for as small an amount as one per cent is very beneficial in standardizing cures.

British Malaya

RUBBER EXPORTS

An official cable from Singapore to the Malay States Information Agency, Malaya House, 57, Charing Cross, London, S. W. 1, England, states that the amount of rubber exported from British Malaya during March last totaled 49,448 tons as compared with 47,926 tons in February and 27,813 tons in the corresponding period of 1928. The amount of rubber imported was 14,553 tons, of which 11,101 tons were declared as wet rubber. The following are comparative statistics:

	1928 Gross Exports Tons	1928 Foreign Imports Tons	1929 Gross Exports Tons	1929 Foreign Imports Tons
January.....	27,731	16,618	52,546	13,415
February.....	28,813	12,911	47,926	12,103
March.....	27,813	10,508	49,448	14,553
Totals.....	84,357	40,037	149,920	40,071

The above figures represent the totals compiled from declarations received up to the last day of the month for export from and import to all ports of British Malaya, and not necessarily the actual quantity shipped or landed during that month.

DISTRIBUTION

The following is a comparative return of distribution of shipments during the months of February and March, 1929:

	Feb., 1929 Tons	Mar., 1929 Tons
United Kingdom	6,450	6,899
United States	32,827	33,210
Continent of Europe	5,516	5,547
British Possessions	852	1,027
Japan	2,172	2,589
Other foreign countries	109	176
Totals	47,926	49,448

Proposed "Wickham" Memorial

It has been suggested that friends and associates of the late Sir Henry Wickham would welcome the opportunity of being connected with a permanent memorial to Sir Henry, whose services in connection with the introduction of Hevea to the East laid the foundation of the vast rubber plantation industry.

A suggestion has been made that an appropriate form of memorial would be a marble bust to be placed in the building of the Royal Empire Society (formerly the Royal Colonial Institute) where Sir Henry spent many of the later years of his life. Donations of any amount will be welcomed, as it is desired that the list should be open to all who would like to be associated with the proposal. If a larger total amount is received than is necessary for the marble bust, it will be devoted to some other suitable form of memorial, such as bronze replicas for presentation to organizations connected with the rubber industry in various parts of the world.

Donations should be forwarded to Mr. F. G. Smith, 2, Idol Lane, Eastcheap, London, E. C. 3, who has consented to act as Honorary Treasurer of the Fund. Checks should be made payable to, or crossed, "Wickham Memorial Fund."